ANCIENT INDIA

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Number 3 January, 1947

NOTES

1. At the present time, the Archaeological Survey of India holds practically a monopoly of archaeological exploration and excavation in India, outside the State territories. The position is a lamentable one, and the Survey would be the first to welcome its termination. 'The spirit of monopolists', wrote Gibbon the historian, 'is narrow, lazy, and oppressive: their work is more costly and less productive than that of independent artists; and the new improvements so eagerly grasped by the competition of freedom are admitted with slow and sullen reluctance in those proud corporations, above the fear of a rival, and below the confession of an error'. Gibbon was writing of the Universities of Oxford and Cambridge in the eighteenth century, but his words may be given a modern application. Archaeology, like other sciences, can flourish only on a basis of healthy emulation and informed criticism. This means that the Indian universities, like other universities throughout the world, must enter the field and join the fray.

2. Let not these words be taken up without a seemly preparation. It is not asked, for example, that Allahabad University shall send out an army of students tomorrow to attack Kauśāmbī, or that Patna University shall forthwith hew up the hallowed ground of Rājgir or Vaiśālī. Trained leaders are the first essential: men paid by their universities for a solid twelve-months' training, and then paid by their universities for passing on their training in subsequent years. Experience has shown that, properly led, the young Indian student is as apt a pupil of field-archaeology as is the student of any other nation. To teach him is a pleasure and an inspiration. He learns quickly and keenly. But he must naturally have his leader, and it is the responsibility of the university to provide the leader. The Archaeological Survey will gladly co-operate in that leader's training, provided that the period of tuition is not unduly restricted. In field-archaeology tuition is useless without experience, and the acquisition of experience takes time. A year's hard work in the Survey is the minimum required by a leader who is to command the confidence of his pupils.

3. If but a few of the Indian universities will establish chairs or lectureships in archaeology, and fill them with young men having a knowledge of history, a pride in their countryside, and a proper feeling for the open air, the task is achieved. I have no doubt that, when the men are ready, the necessary money (not large sums) for their fieldwork will be forthcoming. But the men must come first. Without them, any attempt to collect funds would be premature and indeed foredoomed. Money flows from knowledge and confidence, and only a trained man can impart the one and inspire the other.

4. Until such time as the universities see fit to expend the small effort and trivial sums necessary to establish their independent field-researches—as for many decades have several of the universities of America—that over-burdened monopolist, the Archaeological Survey of India, must needs struggle ahead alone. And, being alone, it must map its route with the greater care. It must work to a definite plan, if its tiny efforts are to achieve

major results within any measurable space of time. In the 'Technical Notes' of this issue (p. 143) I have dealt with the outstanding need of Indian field-archaeology at the present moment, namely, the provision of careful time-tables or sequence-tables of ancient cultures in various parts of India, as a basis for subsequent research on a more expanded scale. Scientifically observed and recorded 'deep digging' or 'vertical digging' is the primary essential. I have emphasized the limitations of this type of digging, and have pointed out that it will not provide that sociological conspectus of ancient civilizations which is a main ultimate goal of archaeology. But without it we cannot begin to adjust our historical or prehistorical perspective, to inter-relate and co-ordinate the results of more ambitious work. And that is the reason why the Archaeological Survey, in its scheme of fieldwork for the next two or three years, has concentrated upon short-term, deep excavations on a series of carefully selected sites both in North and in South India.

5. In our present scrappy knowledge of pre-medieval Indian archaeology, two main blanks have long been recognized. The first is the great gap of a millennium or more between the Indus Valley Civilization (perhaps ended *c.* 1500 B.C.) and the inclusion of North-West India within the Persian Empire (after 518 B.C.). The second is the main succession of cultures in South India prior to the Pallava period of the seventh century A.D. In the hope that North and South may march forward hand in hand, and above all that the universities of North and South may acquire and maintain an equally active interest in field-research, the Archaeological Survey has decided to tackle the two great problems turn and turn about. In the North, the first need was to determine more closely than hitherto the approximate date of the extinction of the Indus Valley cities. Accordingly, the key-site of Harappā, in the Punjab, has been re-investigated, with important and relevant results which are described in this Number (pp. 58ff.). These results must be followed in due course by an attempt to find a site on which successive occupations subsequent to the Indus Valley civilization may extend our knowledge into the Blank Millennium, and may so tell us something of the material culture of the formative period during which an Aryan language was first being established in the Land of the Five (or Seven) Rivers. On surface-indications there is no more likely site than the great mound of Bālā Ḥiṣar, at Chārsada, eighteen miles from Peshawar, set fairly in one of the main gateways of India along a likely route of Aryan invasion. Bālā Ḥiṣar is accordingly the next objective of the Archaeological Survey in northern India.

6. In the South, early contacts of the kind which have linked up the Indus Civilization with dated Bronze Age sites in Mesopotamia are at present lacking. A contact of later date, on the other hand, has long been potentially available. I quote a paragraph from the memorandum which I addressed to the staff of the Archaeological Survey on taking over the duties of Director General in 1944:

> In southern India, we have at present even fewer data for reconstructing the progress of human society in its various phases and environments. Material is abundant, its inter-relationship unknown. It is a jumble of words with no consecutive meaning. Here again, planned work can gradually bring order and significance into chaos. A potential datum-line is provided by the impact of Roman commerce upon central and southern India, with the consequent deposition of coins and coin-hoards of known date. The careful correlation of these coins with the contemporary Indian cultures is an obvious starting-point for research. It has not yet been attempted.

7. Search along the coasts of India was shortly afterwards rewarded more amply than could have been hoped. The actual site of an Indo-Roman trading-station was identified near Pondicherry, and excavation there in 1945 fully provided the desired equation between a hitherto unknown Indian culture and closely-dated foreign imports of the first century A.D. The results have been published in *Ancient India*, No. 2, and provide a fresh starting-point for South Indian archaeology.

8. It remains to advance from this new starting-point. Here certain trial-excavations carried out many years ago by Dr. M. H. Krishna, Director of Archaeology to Mysore State, at two sites known as Chandravalli and Brahmagiri in the Chitaldrug district of northern Mysore come into the picture. At both of them occur certain elements of the Pondicherry (Arikamedu) culture, now firmly dated. And at both occur other cultural elements (notably a russet-coated pottery with yellow rectilinear designs) which is absent from Pondicherry but characterizes a large number of other sites in the Indian peninsula and is found as far west as the Dhārwār region in the south of the Bombay Presidency. Here is a chance for linking up our new knowledge over a wide area and of advancing far beyond our starting-point on the Coromandel coast. In collaboration therefore with the Department of Archaeology of Mysore State, the Archaeological Survey proposes shortly to extend the excavation of Chandravalli and Brahmagiri and to link these sites up securely with the classic site of Pondicherry. The next probable step will be to the neighbourhood of Dhārwār where there are known to be links with the Mysore sites, and so, by opening up an area hitherto untouched by field-archaeology, to extend our datum-line across the peninsula from coast to coast.

9. Thus by limited but, within the prescribed limits, thorough excavation on a series of carefully selected sites, our knowledge of the culture-sequences of North and South India is now increasing at a satisfactory pace. But all this is in the nature of preparatory work. The work in bulk—the uncovering of complete town-sites of specified periods—must follow, and can only be undertaken adequately by that devolution of effort for which I appealed at the beginning of these notes. The Archaeological Survey can and should lay down the guiding lines of the archaeological map, but it is for trained local effort—above all, for the universities—to fill in the details without which the map will remain a mere abstraction.

R. E. M. W.

SULṬĀN GHĀRĪ, DELHI

By S. A. A. Naqvi

The oldest Muslim tomb known to exist in India lies unnoticed in a remote corner of Delhi province. The tomb, locally named Sulṭān Ghārī ('Cave King'), was built by Īltutmish in 1231 for his eldest son and heir-apparent, Prince Nāṣiruddīn Maḥmūd. The monument embodies some essentially Hindu modes of construction and decorative devices and incorporates pillars and other masonry removed from Hindu temples. The remains of humble houses in the vicinity are interesting examples of the domestic architecture of the late Moghul period. The following article is by an officer of the Archaeological Survey of India, who has made a special study of the pre-Moghul monuments of Delhi, but it has been rendered possible by the enthusiasm of a number of officers and other ranks of the Royal Air Force who, whilst awaiting repatriation, devoted much time and skill to the preparation of the plans and drawings under the leadership of Mr. H. Waddington, then Assistant Superintendent in charge of the Delhi Circle of the Archaeological Survey, and Squadron-Leader H. R. Allen. In the preparation of the article, special acknowledgment is due to the collaboration of Mr. W. H. Groves, also of the R.A.F.

A. The Site and its History

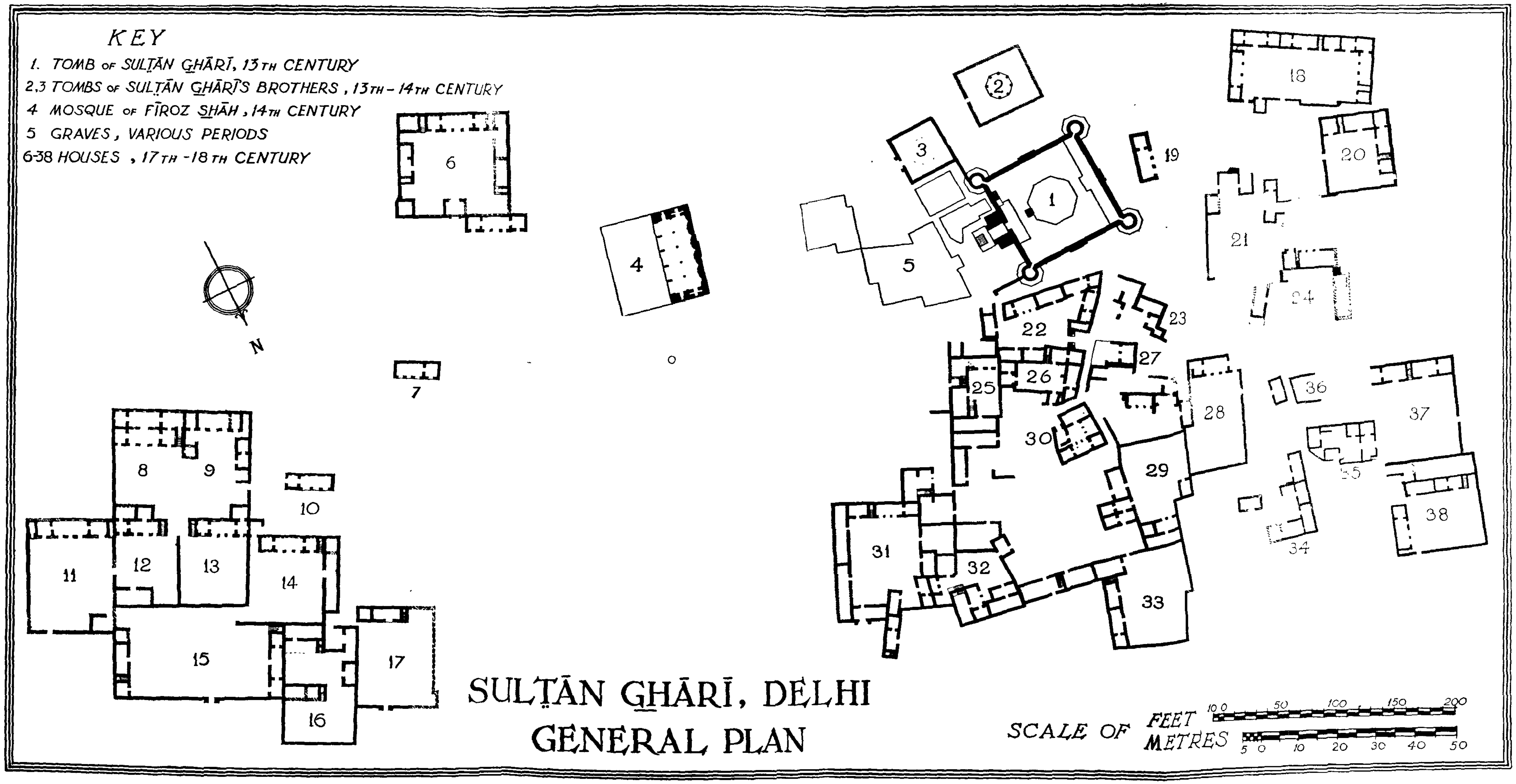
FOUR miles at a true bearing of 280 degrees from the Quṭb in the Delhi province are to be seen the ruins of a derelict town known as Sulṭān Ghārī from the tomb which stands there. The site lies on the edge of an extensive plateau overlooking the plain of the Jumna towards the north, and must have been picturesque when the dam of Maipālpur, about half a mile to its north-west, retained the rain-water and secured the irrigation of the surrounding country.

The plateau, which is really an extension of the hills of Delhi, consists of light, sandy soil. The surface is generally barren save for a stunted growth of *kīkar* (*Acacia arabica*) or *karil* (*Capparis aphylla*) or the small thorny bush of *berī* (*Zizyphus nummularia*). The surface of the ground is sprinkled with the thin shiny laminae of mica. The native quartzite jutting up from the ground here and there is hard and sharp-edged. The water-level is deep, and irrigation by well almost impracticable.

The remains of Sulṭān Ghārī, by reason of their remoteness, are relatively little known, but there are features which make them worthy of study. Here stands the oldest Muslim tomb[1] (A.D. 1231) in India; whilst other buildings in the town belong to the period of Fīroz Shāh (1351-88) and the late Moghul Emperors of Delhi (late seventeenth and eighteenth centuries).

The date and circumstances of the foundation of the town and of its abandonment are unknown. The local villagers believe that Mahīpāla (*c.* 961-979), a Tomara prince of

[1] Fergusson in his *History of Eastern Architecture* (London, 1910), II, 209, speaks of the tomb of Īltutmish as 'the oldest tomb known to exist in India'. But there is epigraphical evidence (see below, p. 5) that the tomb of Sulṭān Ghārī was built in 1231, whilst the date of the tomb of Īltutmish (died 1235) is uncertain. Some think that it was built in the Sultān's own life-time (cf. Carr Stephen, *Archaeology and Monumental Remains of Delhi*, Ludhiana, 1876, p. 73); Syed Ahmad Khan states that it was built by his daughter, Sulṭāna Raẓiyah (1236-39) (*Āṣār-us-Ṣanādīd*, Delhi, 1848, I, 155).


KEY
1. TOMB OF SULṬĀN G̱HĀRĪ, 13TH CENTURY
2,3 TOMBS OF SULṬĀN G̱HĀRĪ'S BROTHERS, 13TH - 14TH CENTURY
4 MOSQUE OF FĪROZ S̱HĀH, 14TH CENTURY
5 GRAVES, VARIOUS PERIODS
6-38 HOUSES, 17TH - 18TH CENTURY
N
SULṬĀN G̱HĀRĪ, DELHI
GENERAL PLAN
SCALE OF FEET
SCALE OF METRES

Dillī, built a *bund* (embankment) at Maipālpur, a village to the north-west of Sulṭān Ghārī.[1] A settlement called Malikpur, later known as Sulṭān Ghārī, soon sprang up on the well-irrigated land near the *bund* and eventually developed into a town. The abandonment of the town is ascribed locally to a severe drought about two hundred years ago.

The earliest reference to Malikpur is by Fīroz Shāh in his *Futūḥāt*. He states that he reconstructed the tomb of Sulṭān Mu'izuddīn (1239-41), son of Sulṭān Shamsuddīn, and repaired the enclosure-wall and built a new dome over the tomb of Sulṭān Ruknuddīn (1235-6), son of Shamsuddīn, both at Malikpur.[2] Both these tombs can be identified from Fīroz Shāh's description.

The name 'Sulṭān Ghārī' makes its first appearance in 1846 in the *Āṣār-us-Ṣanādīd* [3] of Syed Ahmad Khan. Syed Ahmad quotes no authority, but gives the name to the tomb possibly on account of the vaulted crypt (*ghār*) in which Prince Nāṣiruddīn Maḥmūd (died 1229) is buried. Today the villagers extend the name to the whole group of ruins.

An inscription on the gateway of the tomb provides us with the first definite date in the history of the town and runs as follows [4]:—

امر ببنا هذه البقعة المباركة السلطان المعظم شاهنشاه الاعظم مالك رقاب الامم ظل الله فى العالم

ذو الامان لاه[ل الايمان وارث ملك سليمان صاحب الخاتم فى ملك العا]لم سلطان السلاطين شمس الدنيا والدين

المخصوص بعناية رب العالمين ابى المظفر ايلتمش السلطان ناصر امير المومنين خلد الله ملكه لروضة ملك ملوك

الشرق ابى الفتح محمود تغمده الله بغفرانه و اسكنه بحبوبة جنانه فى شهور سنه تسع و عشرين و ستمائة *

'This blessed building was ordered to be erected by the great Sulṭān, the most exalted Shāhanshāh, the Lord of the necks of the people, the shadow of God in the world, the bestower of safety on the [believers, the heir of the kingdom of Sulaimān, the master of the seal in the kingdom of the] world, the Sulṭān of Sulṭāns, Shamsud-dunyā-waddīn, who is specially favoured by the Lord of the worlds, Abul Muẓaffar Īlt(ut)mish-as-Sulṭān, the Helper of Prince of the Faithful, may God perpetuate his rule,—to (serve as) a mausoleum for the king of the kings of the East, Abul Fatḥ Maḥmūd—may God forgive him with his indulgence and make him dwell in the centre of Paradise—in the months of the year 629 (A.D. 1231).'

Abul Fatḥ Maḥmūd (cognomen Nāṣiruddīn) was the eldest son of Sulṭān Shamsuddīn Īltutmish. He was 'a beneficient, intelligent, sensible and sagacious prince, endowed with great energy and gallantry, and was munificent and benevolent.' [5] He was first awarded the fief of Hānsi (District Hissar, Punjab) and was next appointed to the governorship of Oudh by his father. He fought several wars and by his acts endeared himself to his co-religionists. He then proceeded to Lakhnautī (Bengal), defeated Ghiyāṣuddīn 'Iwaẓ Khaljī, and put him to death. He held authority over Lakhnautī till his death in A.D. 1229. His tomb is even now regarded as sacred by the Muslims and every year on the seventeenth

[1] Cf. Cunningham, *Archaeological Survey of India Report*, I (Simla, 1871), 148. The present *bund* is the reconstruction of Fīroz Shāh, Shams-i-Sirāj 'Afīf, *Tārīkh-i-Fīrozshāhī*, ed. Vilayat Husain (Calcutta, 1891), p. 330.

[2] *Futūḥāt-i-Fīrozshāhī*, ed. by Sh. Abdur Rashid (Aligarh, 1943), p. 16.

[3] *Āṣār-us-Ṣanādīd* (Delhi, 1848), pp. 206–8.

[4] *Epigraphia Indo-Moslemica*, 1911-12, p. 23.

[5] *Ṭabaqāt-i-Nāṣirī*, ed. by N. Lees (Calcutta, 1864), p. 180

day of the month of *Z̲īq'ad*, his '*Urs* or anniversary is celebrated and the shrine is thronged with pilgrims.

It appears from the *Futūḥāt-i-Fīroz S̲h̲āhī* that the mausoleum also accommodated a college. Fīroz S̲h̲āh writes, 'The *madrasa* (college) of Sulṭān S̲h̲amsuddīn Īltutmis̲h̲ had been destroyed. I rebuilt it and furnished it with sandalwood doors. The columns of the tomb, which had fallen down, I restored better than they had been before. When the tomb was built, its court (*sahan*) had not been plastered, but now I made it so. I provided the hewn stone staircase of the dome, and I re-erected the fallen piers (*pus̲h̲tī*) of the four towers.'[1]

Though Fīroz S̲h̲āh does not specify the place where the *madrasa* repaired by him was situated, it is clear from the context that it was at Malikpur (Sulṭān G̲h̲ārī). The peristyle verandah of Sulṭān G̲h̲ārī's tomb built by Īltutmis̲h̲ is spacious enough to have accommodated a *madrasa*, and the practice of having one within a tomb-enclosure is attested by the tombs of 'Alāuddīn K̲h̲aljī at Quṭb and of Fīroz S̲h̲āh at Ḥauẓ K̲h̲āṣ. Moreover the repairs carried out by Fīroz S̲h̲āh can still be identified on close observation. The columns inside the tomb-chamber, the plaster of the courtyard, the hewn stone staircase of the dome (by which he evidently means the octagonal roof of the tomb-chamber) and the sides of the four corner-towers, all tally with the description of the Sulṭān.[2]

Fīroz S̲h̲āh also built a *k̲h̲ānqāh* (monastery) and a mosque at Malikpur, both of which can be identified (below, p. 9). The mosque could accommodate about three thousand persons, and, on the assumption that the central mosque of a locality should be large enough to hold the whole of the adult male Muslim population of that locality, we may regard that number as very roughly representing that section of the population at Malikpur in the fourteenth century. To this figure should be added another four to five thousand to represent the Muslim female and child population. There is no means of guessing the non-Muslim population, but the presence of a Sanskrit inscription[3] on a stone used in the walls of one of the houses in the town indicates that Hindus and Muslims both lived here.

The third and last distinctive period in the history of the town is coeval with the extant buildings of the late Moghul period. The long gap of three centuries between the Tug̲h̲laq and the late Moghul buildings suggests that for some reason or other the town lost its status during the intervening period. When it once more attracted people in the late

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[1] *Futūḥāt-i-Fīrozs̲h̲āhī*, p. 16.

[2] Carr Stephen (op. cit., p. 75) says that the extract from the *Futūḥāt-i-Fīrozs̲h̲āhī* quoted above is 'rather puzzling'. This is due to the fact that he tries to identify the building in question not with the tomb of Sulṭān G̲h̲ārī built by Īltutmis̲h̲, but with the tomb of Īltutmis̲h̲ himself, for which there is no justification.

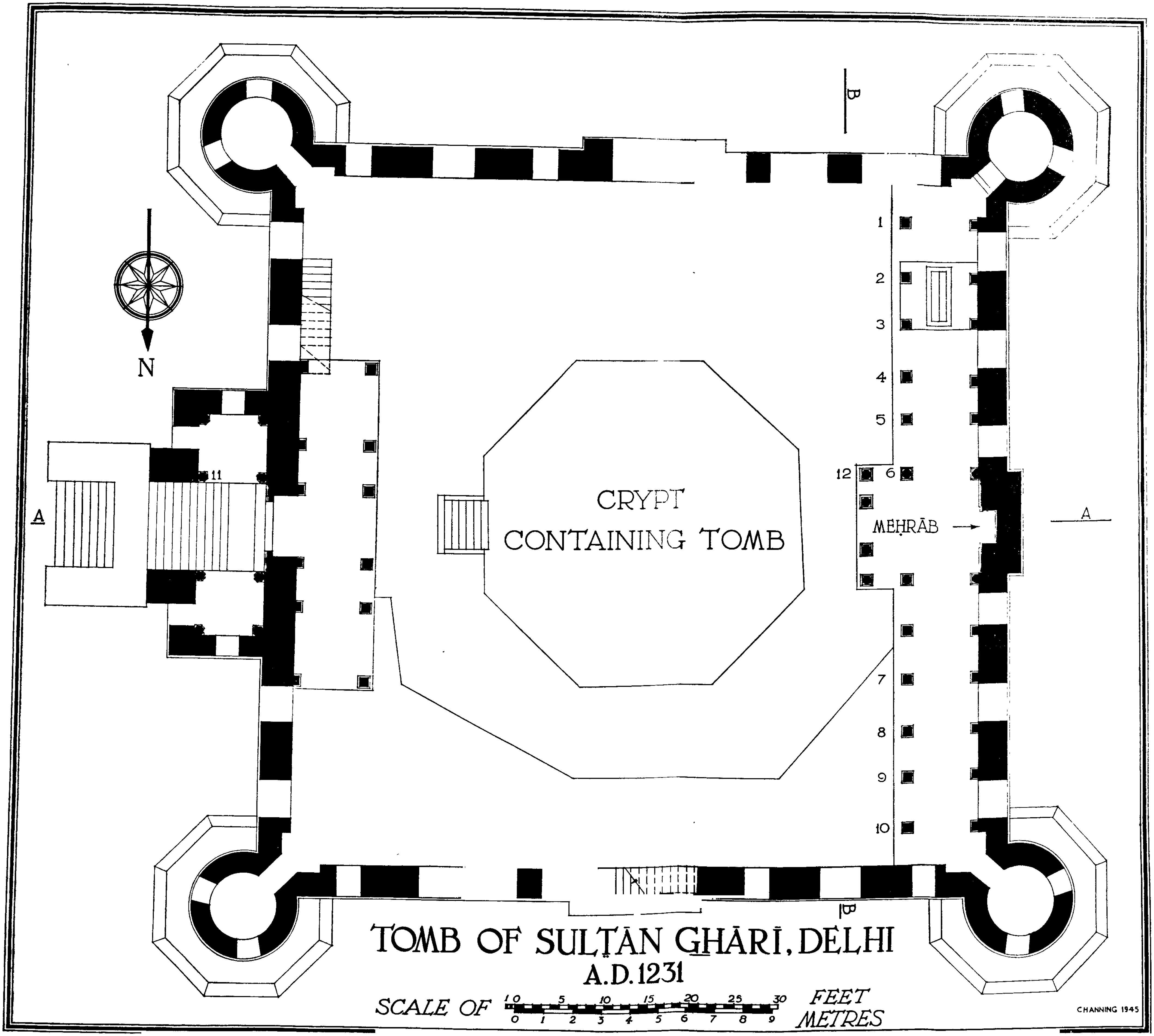
[3] Dr. N. P. Chakravarti has kindly supplied the following note on the inscription:—

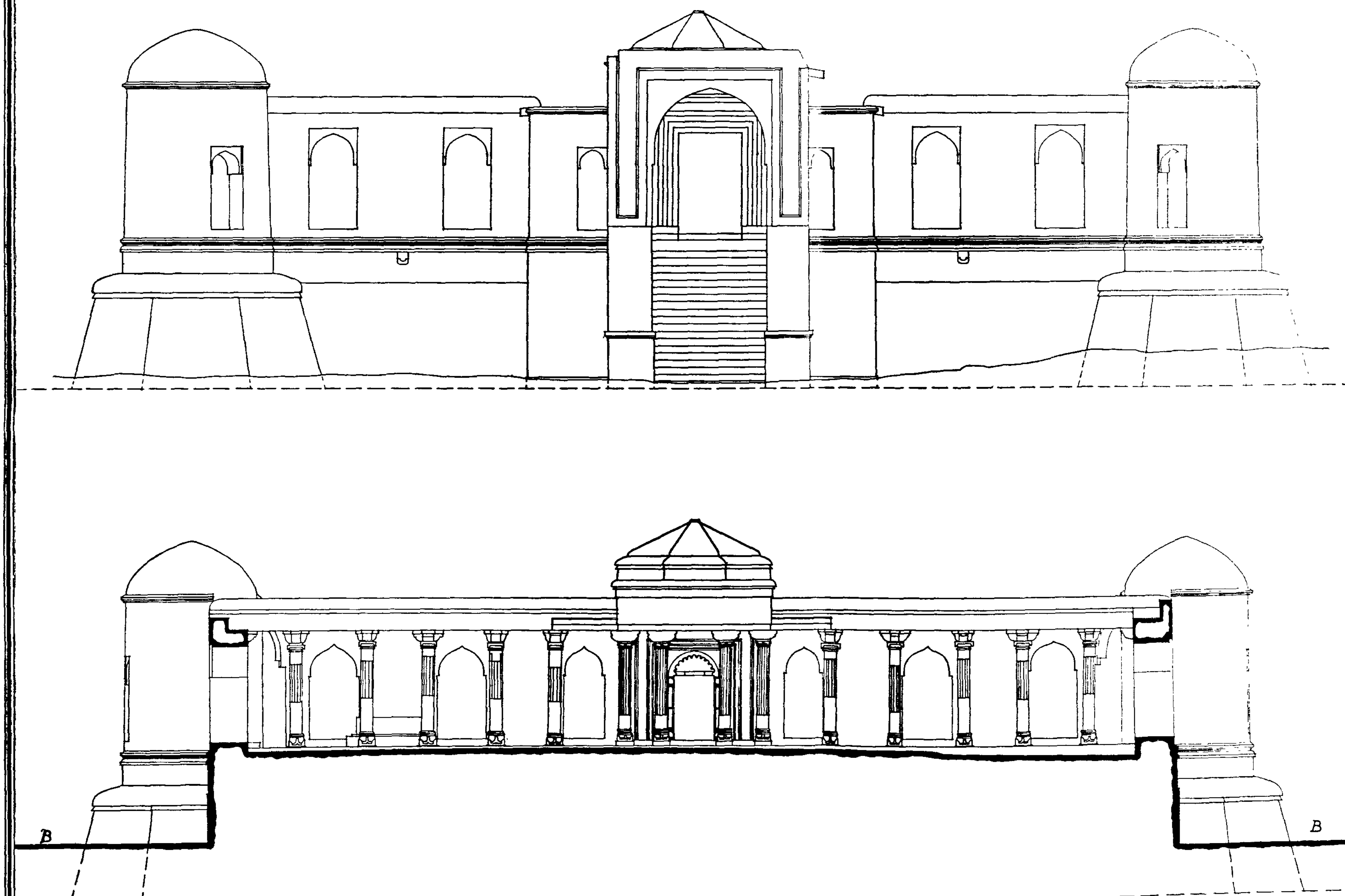
The language of the inscription is incorrect Sanskrit and the script is Nāgarī.

Text.—1. Siddham (expressed by symbol) svasti śrī
2. saṁvat 1418 varshe
3. Bhādava vadi 5
4. Gurau dine । vi[vā]
5. ha-puḥkaraṇaṁ [Sū]
6. tradhāri Shoṭi-
7. [yā] Sīhā-suta.

Translation.—'Siddham (expressed by symbol). Hail: prosperity. In the year 1418 of the (Vikrama) *saṁvat*, on the 5th day of the dark half of Bhādra, Thursday, a tank (was dug) on the occasion of the marriage ceremony. The mason Sho(Kho)ṭiya, son of Sīha (Siṁha).'

Taking the month to be *Pūrṇimānta* and the year *Chaitrādi*, the date would be Thursday, the 22nd July, A.D. 1361.

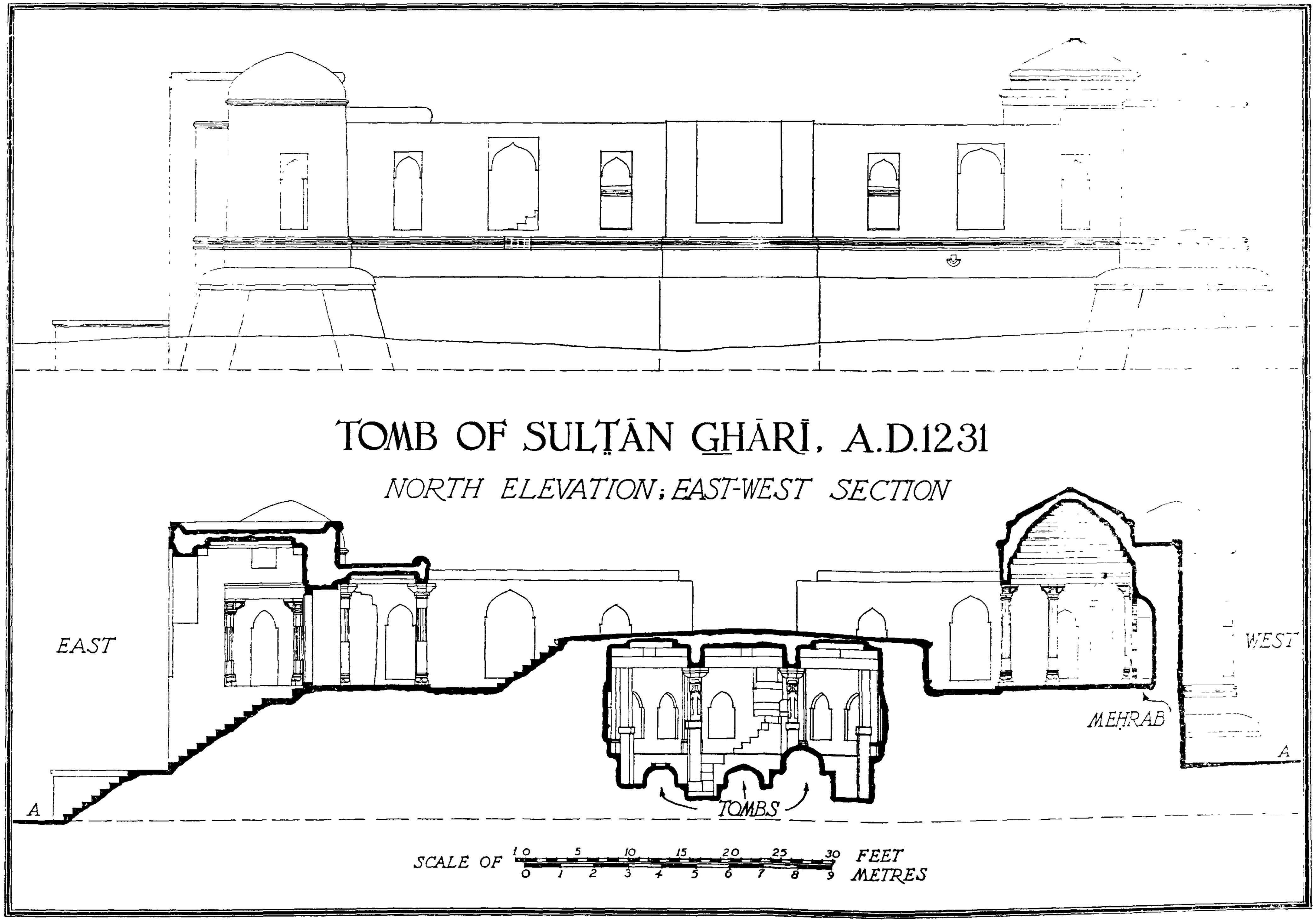

B
N
CRYPT
CONTAINING TOMB
MEHRĀB
A
A
11
12
1
2
3
4
5
6
7
8
9
10
B
TOMB OF SULṬĀN GHĀRĪ, DELHI
A.D. 1231
SCALE OF FEET
METRES
CHANNING 1945



TOMB OF SULṬĀN GHĀRĪ, EAST ELEVATIONS, EXTERNAL & INTERNAL

SCALE OF 10 5 0 5 10 15 20 25 30 FEET
0 1 2 3 4 5 6 7 8 9 METRES

W H GROVES 1945.


TOMB OF SULṬĀN GHĀRĪ, A.D. 1231
NORTH ELEVATION; EAST-WEST SECTION
EAST
WEST
MEHRAB
TOMBS
A
A
SCALE OF
10 5 10 15 20 25 30 FEET
0 1 2 3 4 5 6 7 8 9 METRES

Moghul period, its royal patronage was not restored, and all the buildings of this period belong to the common people.

B. The Lay-out of the Town

From its extant remains Sulṭān Ghārī appears to have been a village rather than a town, as the visible remains extend over a length only of some six hundred yards (pl. I). But it must have been larger than it appears now, as the débris in the vicinity seems to indicate the former existence of other buildings. Except for the mosque and the tomb, the buildings are in a bad state of preservation and in some cases little more than the foundations remains.

The lay-out of the town shows an absence of deliberate planning. The general focus appears to have been the tomb of Sulṭān Ghārī, perched on a natural elevation. The analogy of many towns in northern India suggests that the open space in front of the tomb may have served as the market-place and meeting-ground for the people of the neighbouring villages. The existing graves there are recent additions by the local villagers. The central mosque of the town (Jām'i Masjid), now in a dilapidated condition, lies to its south.

Also to the south of Sulṭān Ghārī's tomb are the remains of the *khānqāh* (monastery) built by Fīroz Shāh (see above), and in the same direction, about fifty feet away, lie the enclosed tombs of Ruknuddīn Fīroz Shāh (d. 1236) and Mu'izuddīn Bahrām Shāh (d. 1241); one of these has collapsed and the other stands in a decayed condition.

The existing remains of the houses stand in two groups (i.e. *moḥallas*). One group lies at a distance of 600 feet to the east of the tomb of Sulṭān Ghārī, and the other covers nearly the whole of the area to the north and west of tomb. About 150 feet to the south-west of the first *moḥalla* is a solitary house (No. 6 on plan), which may have belonged to some prominent person of the town. As in other medieval towns, the *moḥallas* include an open space (*chowk*) in their centre, possibly for the purpose of ventilation and the accommodation of a few shops.

The roads and lanes of the town are irregular, and the approaches to the interiors of the houses are not easily traceable. There was no system of street-drainage, and sewage discharged into unpaved streets from the houses.

C. The Architecture

The buildings in the town are entirely of locally quarried grey quartzite except the tomb of Sulṭān Ghārī where red sandstone, marble and well-burnt bricks (size $10\frac{1}{2}'' \times 7'' \times 2\frac{1}{4}''$) have also been used. Lime-mortar has been generally used, but mud-mortar is employed in some of the houses. The walls were rendered with plaster, patches of which still adhere to the walls here and there.

The existing remains at Sulṭān Ghārī belong to three phases: (1) 'Turkish' (1191-1290), (2) Tughlaq (1320-1414), and (3) late Moghul (late seventeenth and eighteenth centuries).

1. *The Turkish phase*

The ill-named 'Turkish' is the first Muslim architectural style in India and extends from the Muslim settlement in 1191 until the end of the Slave dynasty in 1290. A characteristic feature of this phase is the trabeate construction adapted from the Hindu tradition to fit Muslim design, the arch and dome being constructed by means of corbelled horizontal courses. The arch is liable to assume the ogee form which was likewise Indian in origin.

The tomb of Prince Nāṣiruddīn Maḥmūd, the eldest son of Īltutmish, now commonly known as Sulṭān Ghārī ('Cave King'), belongs to this architectural phase. It stands on, or rather in, a plinth averaging 10 feet in height and square on plan, which carries an enclosure wall, 3 feet 9 inches thick, pierced with corbelled arched openings on all sides and a gateway in the eastern wall (pls. II and III). In the western wall is a *meḥrāb*, and at the corners are circular bastions covered with corbelled pyramidal domes (pl. VIII A). Along the inner faces of the eastern and western walls stand colonnades. The centre is occupied by an octagonal cell containing the tomb (pls. IV and V).

The gateway projects 13½ feet from the enclosure wall and is approached and entered by a flight of steps flanked by two square rooms which are roofed with stone slabs in the Hindu fashion. The external archway of the gate is formed by overlapping courses of marble, and round it is the important Arabic inscription (in Kūfic characters) which has been cited above (p. 5).[1]

After crossing the threshold, one stands under the eastern colonnaded verandah, the flat roof of which rests on red sandstone pillars. The latter are not uniformly carved, indicating that they have been re-used here from an older building. Opposite this colonnade and along the whole length of the western wall runs another colonnaded verandah (pl. VIII B) with a prayer-chamber in the centre erected in white marble (pl. IX) and covered with a corbelled pyramidal dome. The dome is almost certainly re-used and is lavishly carved internally with Hindu motifs, notably bands of lozenge or triangular pattern (pl. XI A). The marble *meḥrāb* is embellished with verses from the Qurān and a floral design (pl. X). The floor is paved with marble slabs. The rest of the verandah on either side of the prayer-chamber comprises red sandstone pillars and pilasters supporting a flat roof of Hindu design, with a brick-work parapet.

The pillars of the peristyle (pl. VI)[2] deserve notice. Those of the prayer-chamber are of fluted white marble and have an almost Grecian aspect (pl. VI, 6 and 12). Their capitals bear a resemblance to that of the Doric order, combined above with Corinthian-like scrolls. The shafts have sixteen flutes and bases of Hindu character. The remaining sandstone pillars (pl. VI, 1–5 and 7–10) are assembled from different pieces, so that in any given example the present combination of base, shaft and capital may not be original. Pl. VI, 11 shows the details of a marble pillar used in the outer porch.

The octagonal cell in the centre of the courtyard (pl. V), which contains the remains of Nāṣiruddīn Maḥmūd, is 15 feet deep, with its upper portion rising 5 feet above the level of the courtyard. A small doorway 4 feet high in the south side of the cell opens on to a descending staircase with fifteen steps. The tomb-chamber is roofed with slabs of stone supported by four square pillars in the centre and one in each corner of the octagon, which is further strengthened by another pillar, probably an addition of Fīroz Shāh's period.[3] The chamber contains four tombs. The sarcophagus of Nāṣiruddīn Maḥmūd is said to be that near the western wall,[4] but there is no evidence beyond the fact that this is the largest grave in the tomb-chamber. It is more likely, however, that the prince's grave is the one in the centre of the chamber. Externally, the tomb-chamber is faced with marble, and the octagonal flat roof is plastered.

The Hindu elements in the architecture of the monument are apparent in the dome of the mosque and the partly-defaced Hindu motifs on some of the pillar-brackets of the

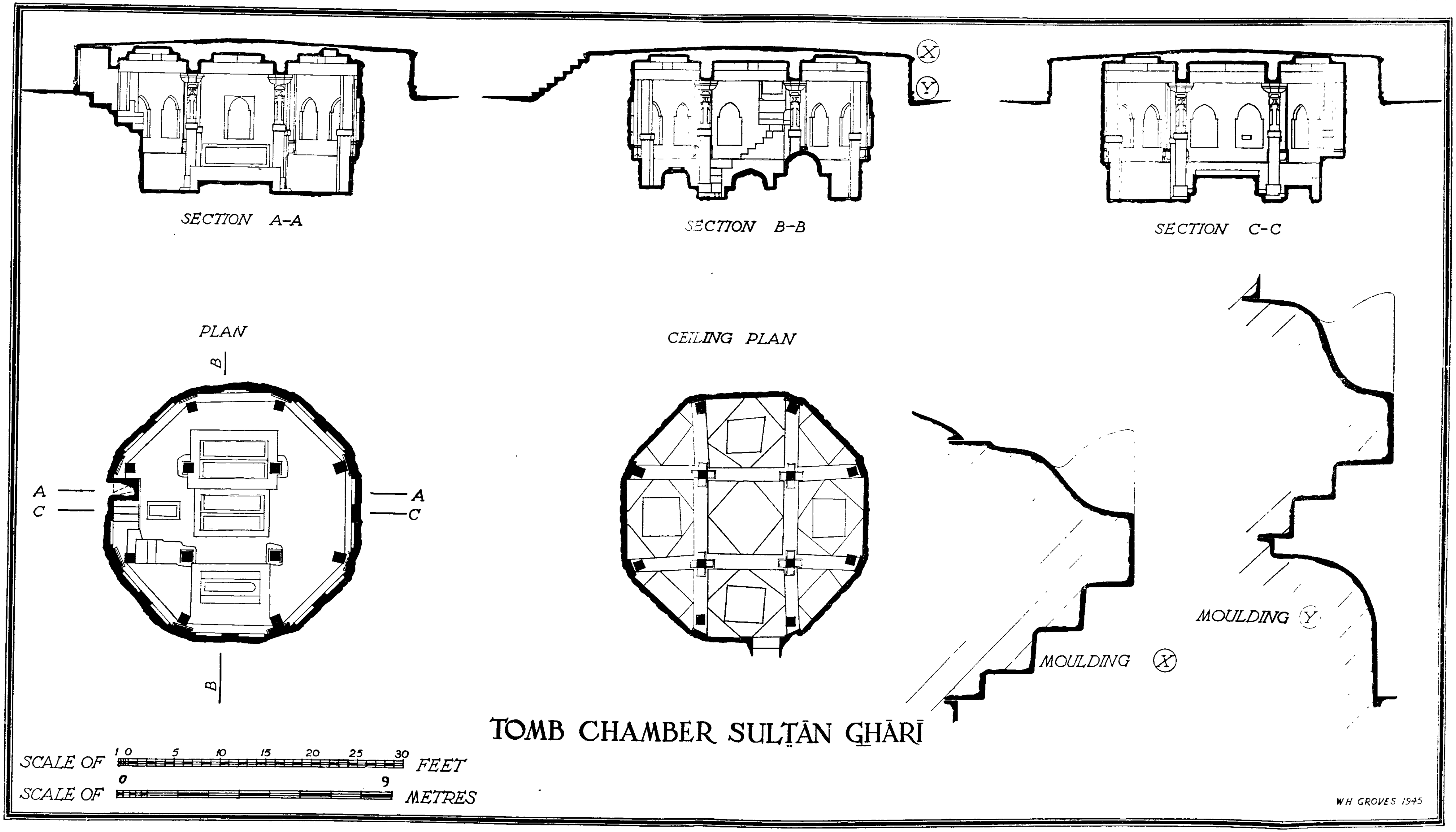
[1] Epigraphs in Kūfic script other than Qurānic verses are seen only at the Quṭb (Delhi), Aṛhāī-Din-kā-Jhompṛa (Ajmer) and at Sulṭān Ghārī. The script became obsolete in India after the thirteenth century.

[2] The numbers given to each pillar on the plate correspond to the numbers on the plan (pl. II).

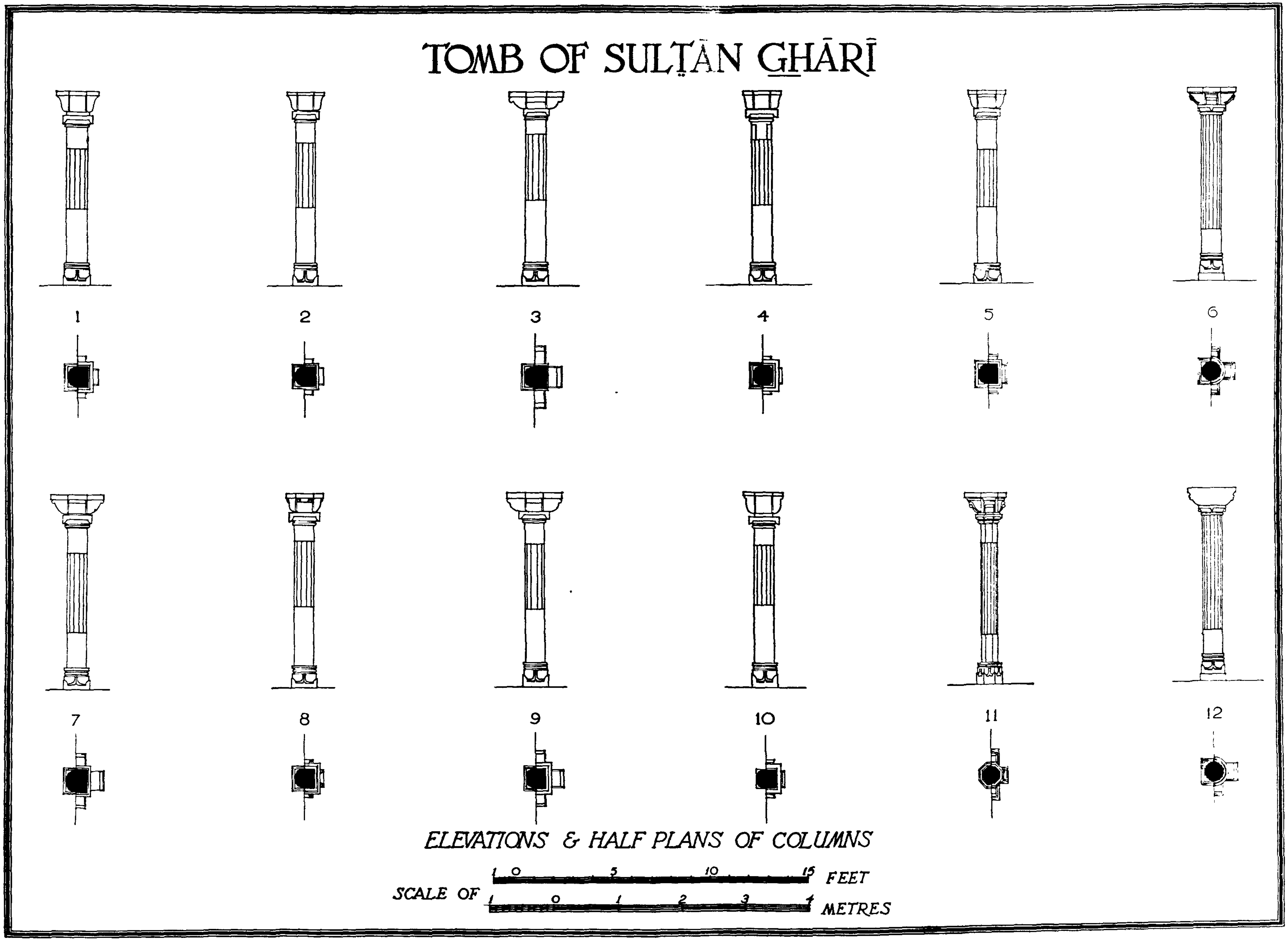
[3] Fīroz Shāh, op. cit., p. 16.

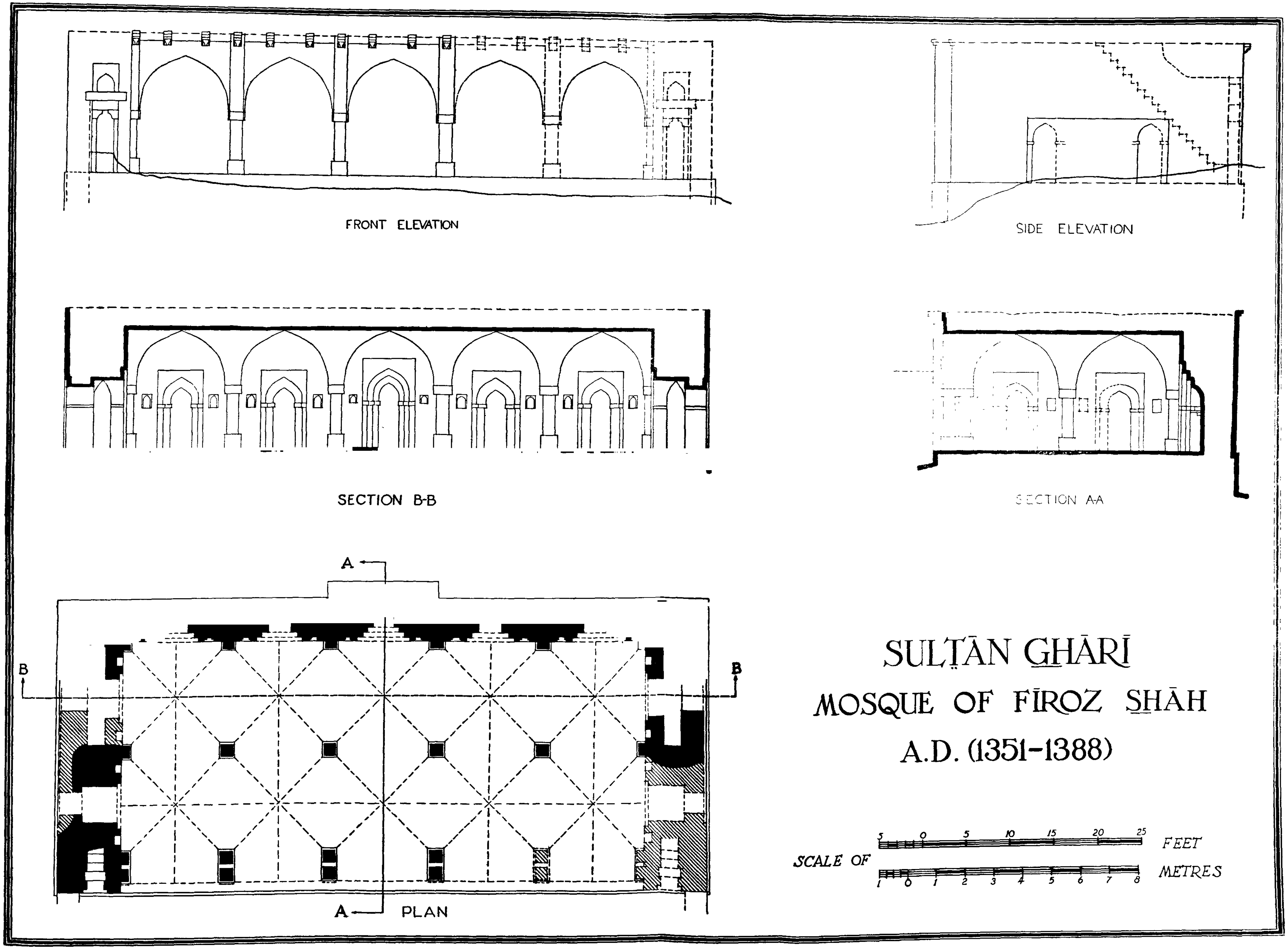
[4] Carr Stephen, op. cit., p. 73.

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TOMB CHAMBER SULṬĀN GHĀRĪ


TOMB OF SULṬĀN GHĀRĪ
1
2
3
4
5
6
7
8
9
10
11
12
ELEVATIONS & HALF PLANS OF COLUMNS
SCALE OF
0 5 10 15 FEET
0 1 2 3 4 METRES


FRONT ELEVATION
SIDE ELEVATION
SECTION B-B
SECTION A-A
A
B
B
A
PLAN
SULṬĀN GHĀRĪ
MOSQUE OF FĪROZ SHĀH
A.D. (1351-1388)
SCALE OF
5 0 5 10 15 20 25
FEET
1 0 1 2 3 4 5 6 7 8
METRES

western colonnade. The presence of a *Gaurī-paṭṭa* (receptacle of a *liṅga*) in the pavement of the western colonnade is a further significant point. Furthermore, the marble stones in the external façade of the mosque are serially numbered, indicating their removal from elsewhere. Indeed, so prominent are the Hindu features that Cunningham was led to believe 'that the tomb of Sulṭān Ghārī with its domes of overlapping courses, appears to be pre-Muhammadan'.[1] Carr Stephen says that the crypt is decidedly pre-Muhammadan, but whether built by Hindu workmen or a Hindu building appropriated by the Muhammadans it is not easy to decide.[2] These views are unacceptable in the light of the Arabic inscription giving the date of the construction of the monument. The Hindu elements are due solely to the re-utilization of Hindu materials and the employment of Hindu craftsmen.

2. *The Tughlaq phase*

The next architectural phase is best named after the Tughlaqs, the third Muslim dynasty in India (1320-1414). The austere forms of their architecture reflect the character of these stern warriors. The distinguishing features are pointed arches with battered walls of great thickness, well-dressed monolithic columns and plastered domes on low necks. The buildings are massive and simple with a monotonous repetition of the same features.

On level ground 50 feet to the south of Sulṭān Ghārī's tomb are situated the tombs of Ruknuddīn Fīroz Shāh (d. 1237) and Mu'izuddīn Bahrām Shāh (d. 1241). Both of these unfortunate Sulṭāns of Delhi were the sons of Sulṭān Shamsuddīn Īltutmish: the former ascended the throne on his father's death in 1235-36 and was deposed in the same year; the latter, who succeeded his sister Sulṭāna Raẓiya, the first and last queen of Delhi, was taken prisoner by his noblemen and murdered in 1241. The tombs are identified on the basis of Fīroz Shāh's description in the *Futūḥāt* that he restored the tombs of the two princes (above, p. 5), but there is no means of identifying the tombs individually. One of them still stands, while the other is represented by a heap of rubble and fragments of columns.

Though the tombs had their origin in the 'Turkish' period, it is probable from Fīroz Shāh's statement that the superstructure was wholly or partly erected by him. The architecture of the standing tomb is in conformity with a Tughlaq date. It is a quartzite *chhattrī* (pavilion), octagonal on plan, resting on eight monolithic columns. The octagonal parapet over the level of the pent (*chhajja*) is decorated with shield-shaped merlons in relief. The oval dome, typical of its age, is plastered and is crowned by an *āmalaka* (pl. XI B). Internally it is gradually reduced from an octagon to a circle and is devoid of any decoration.

It is noteworthy that the tomb is one of the earliest octagonal *chhattrī*-shaped tombs in India. The reign of Fīroz Shāh witnessed the erection of many such structures, e.g. those at Ḥauẓ Khāṣ and the fully developed octagonal tomb of Khān-i-Jahān Tilangānī (d. 1368-69), both at Delhi. This form of tomb-construction was further improved in India in the fifteenth and sixteenth centuries, and the tombs of Mubārak Shāh, Muḥammad Shāh, Sikandar Shāh Lodī and 'Īsā Khān are a few of the many remarkable examples of the type.

At a distance of 250 feet to the east of Sulṭān Ghārī's tomb is a mosque, the pointed arches and thick battered walls of which indicate its Tughlaq origin (pls. VII and XII A). It can therefore be identified with the mosque erected by Fīroz Shāh (above, p. 6).

The mosque is built of local grey quartzite, and stands on a platform 2½ feet high. The prayer-chamber is two aisles deep and is divided into five bays of which part of the

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[1] *Archaeological Survey of India Report*, IV (Calcutta, 1874), p. 60.

[2] Carr Stephen, op. cit.

two northern ones has collapsed. It is roofed by groined arches springing from double square stone pillars in the eastern exterior row and from single pillars inside the chamber. The *meḥrāb* is formed by a simple recessed arch slightly projecting externally. The stone-paved floor of the chamber is in ruins.

The heavy stone brackets projecting from the parapet of the eastern façade of the prayer-chamber indicate the former existence of a pent. The only indication of a gateway in the middle of its eastern enclosure is a stone jamb.

3. *The Late Mog͟hul phase*

The remains of this period at Sulṭān G͟hārī consist exclusively of unpretentious domestic houses (pl. XII B). Being among the few remains of their class, they are not without interest, revealing as they do the conditions in which the ordinary people lived and their humble attempts at decorating their dwellings.

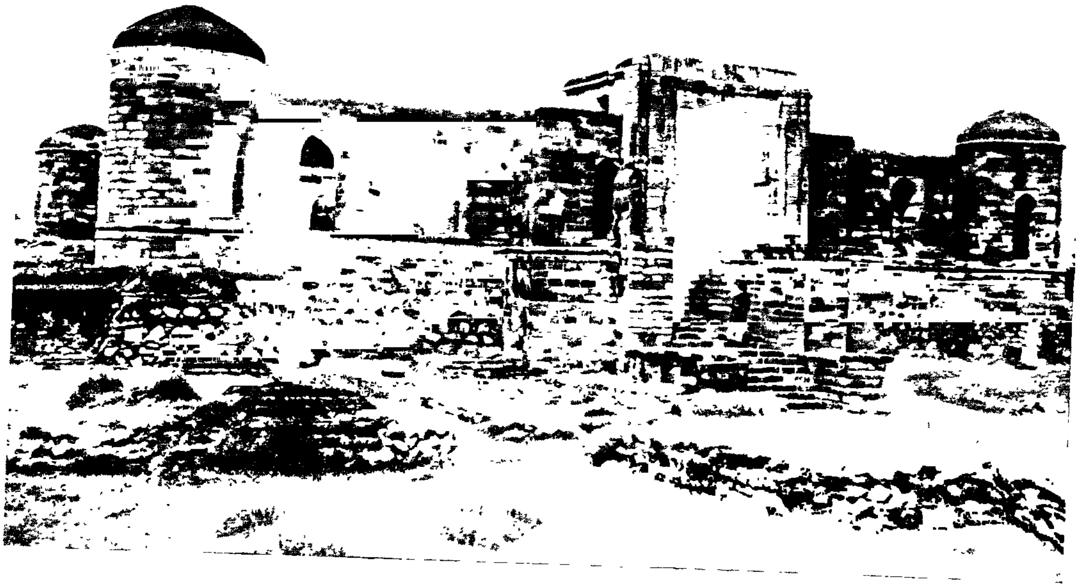
Though the houses now existing at Sulṭān G͟hārī belong to the late Mog͟hul period, some of them, in spite of their Mog͟hul superstructure, may stand on ancient foundations or otherwise incorporate the remains of earlier stuctures.

House No. 6, mention of which has been made above (p. 7), is the best-planned house now identifiable. It is built of quartzite rubble and stands on a plinth 3 feet high. It faces the central open space of the town, and has a door in the middle of its northern wall and a room in the western half of its external face. The doorway opens into the inner side of the enclosed courtyard of the house. On the opposite side is a *dālān* with three arched openings and an ante-room at each end. Patches of stucco bear traces of floral designs. Many of the walls contain niches (*tāq*), but there are no windows.

Square or oblong sockets at the tops of the walls indicate that the house was roofed with beams; that they were covered with wooden planks and a thick layer of concrete is also evident from the remains. The roof was drained through the parapet-wall by water-spouts, leading down a cement channel on the face of the wall. Flanking the eastern and western walls of the house are small rooms and a collapsed verandah.

The group of houses (Nos. 7–17) forming the eastern *moḥalla* of the town is more regular in lay-out than the western group. Most of the houses consist of a big central *dālān* with two ante-rooms at each end. The only houses in which deviations are observed are No. 16 and 17; while houses No. 7 and 10 are so dilapidated that it is difficult to guess their plan. The only noteworthy architectural feature in this group is the flower- and leaf-pattern incised in the plaster of the soffits and spandrils of the arches in house No. 11.

The irregular western group of houses (Nos. 18–38) does not differ materially from the eastern group. A noteworthy feature, however, is the use of vaults to form the roof of houses No. 22 and 25. It is also clear from the remains that some of the houses were double-storeyed. House No. 21 contains a Sanskrit epigraph inscribed on a stone shaft built into the western wall of the house (above, p. 6); while house No. 27 contains a stone *liṅga* used as a lintel in one of the blind arches.



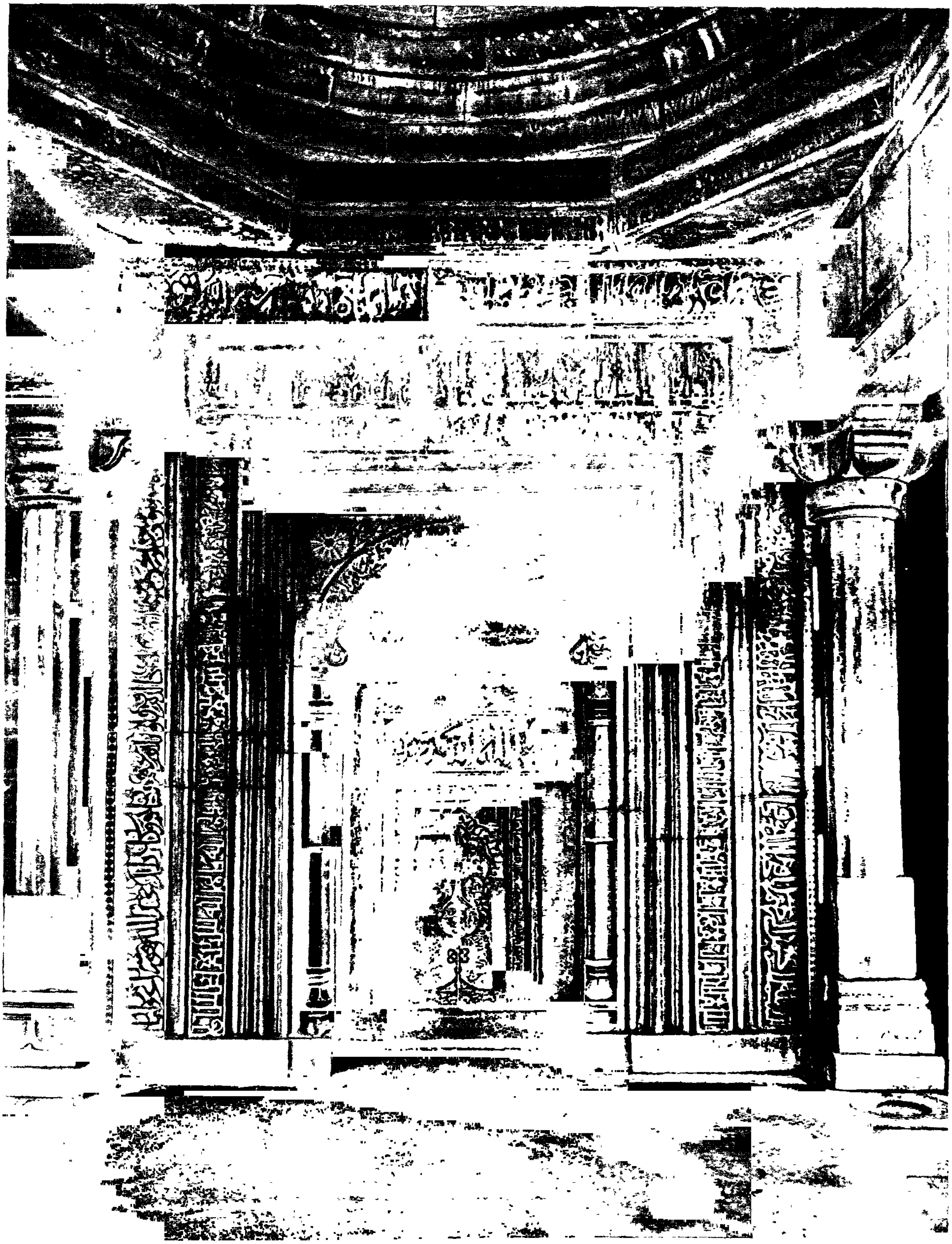
A. *Tomb of Sulṭān G͟hārī, Delhi : east front*



B. *Tomb of Sulṭān G͟hārī : western colonnade*



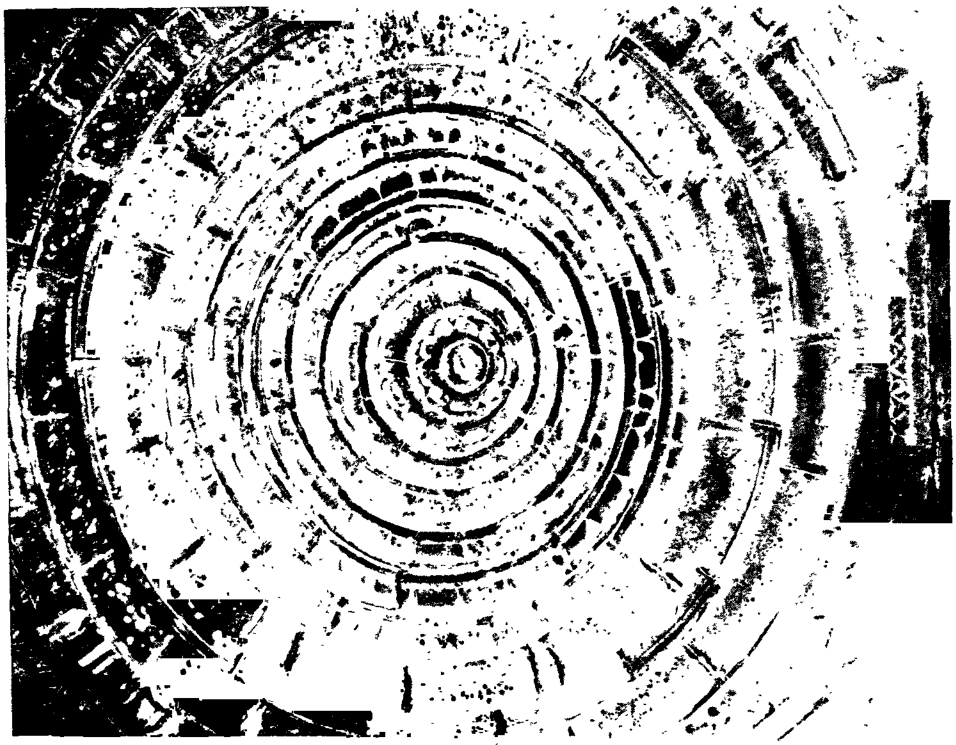
Tomb of Sulṭān G͟hārī : prayer-chamber



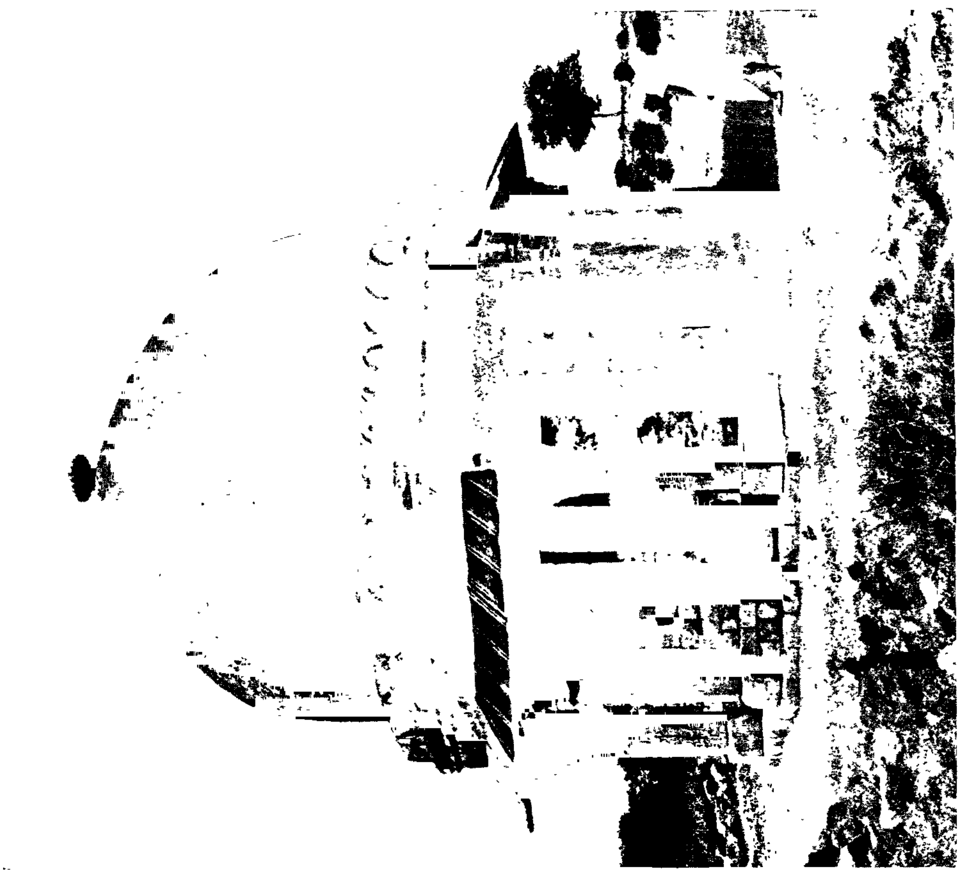
Tomb of Sulṭān G͟hārī : meḥrāb

PLATE XI

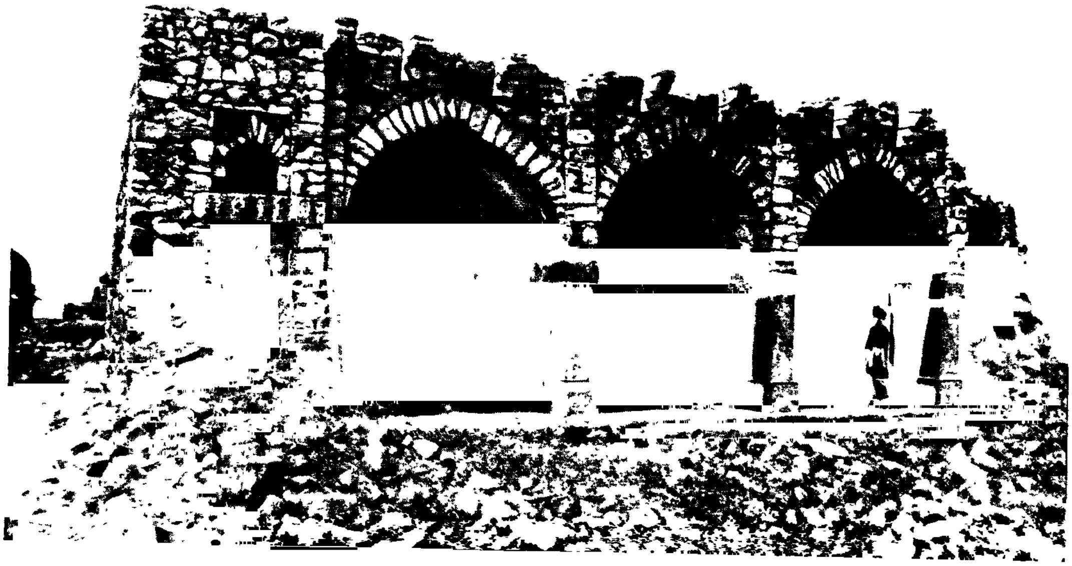
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A. *Tomb of Sulṭān G͟hārī : dome of prayer-chamber, interior*



B. *Tomb No. 2, adjoining the tomb of Sulṭān G͟hārī*



A. *Fīroz Shāh's mosque, east of Sulṭān Ghārī's tomb*



B. *Late Moghul houses north of Sulṭān Ghārī's tomb*

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Quaternary Terrace System of Vishāv River in the Himalayan Region. T I, T II, etc., terraces; G 3, third glacial deposits; LK, Lower Karewa Beds. (*After De Terra and Paterson.*)

STONE AGE INDIA

By V. D. KRISHNASWAMI

If, as is now suspected, Man in Europe had already half a million years ago reached a definitive stage in the production of the tools and weapons wherewith to master his environment, it seems likely that for a commensurate period India has been the scene of a similar upward struggle. In many parts of India the river-terraces have yielded stone implements of types associated with palaeolithic man in Europe and Africa. How far these parallel developments in East and West actually synchronized is matter for further research; as is also the presence in India of extensive microlithic industries which in many respects recall the 'mesolithic' of Europe and North Africa. Again, the neolithic phase, which is represented in astonishing abundance in central and southern India and is not altogether absent from the north, is still devoid of context although it must form the background of important episodes in the development of Indian cultures and even civilizations. Up to the present time, only restricted and spasmodic research has been carried out into these problems, and that almost entirely by foreign scholars. The time has come for the Indian student to shoulder his knapsack and to explore the river-valleys, the caves and rock-shelters and the open sites where lived the earliest inhabitants of his countryside. In this paper the Prehistorian of the Archaeological Survey of India reviews our present knowledge of the Indian Stone Age, and suggests some of the general lines along which future work may usefully proceed.

CONTENTS

I. INTRODUCTION

THE TERM 'STONE AGE'

THE cultural stages of Man antecedent to the times when utile metal was first exploited by him are collectively known as the Stone Age, from the material chiefly used by him in fabricating the tools with which he began his career of power and control over environment. This Age has customarily been divided into two main divisions, christened by Lubbock in 1863 as the *Palaeolithic* (Old Stone) Age and *Neolithic* (New Stone) Age.[19] In the palaeolithic, man was like his contemporary animals parasitic on nature for his food, hunting these with stone implements characteristically *chipped* and *flaked*. In the subsequent period he learned to live in co-operation with nature so as to increase his food-supply through agriculture and the domestication of animals, and to practise some of the basic arts of civilized life. The stone artifacts now employed by him are characterized by a grinding and polishing that have led some to name this stage the *Polished Stone Age*, and during these times, if not earlier, the art of making pottery vessels was invented.

The gap originally postulated between the two Ages in Europe vanished about 1900, when other industries were discovered sandwiched between the two and assigned to a *Mesolithic* (Middle Stone) Age.[15] This Age was essentially a continuation of the nomadic Palaeolithic stage.

Of these three stages, the Palaeolithic has a geological antiquity deeply rooted in the Pleistocene; it comprises a far longer period than can be assigned to the two later stages taken together, the era of which has been distinguished as the Holocene (Recent) period. The

present paper is an attempt to delineate this tripartite sequence of the Stone Age in human history as applied to the sub-continent of India; and India, it may be premised, is 'one of the richest countries in the world for remains of the earliest phases of man's existence'.[63]

PIONEER WORK

The study of the Stone Age of Man as a branch of archaeology followed the daring claim of Boucher-de-Perthes, made about 1847, that he had found flint tools, evidently of human fabrication, in the old terrace deposits of the river Somme at Abbeville, in association with a long extinct fauna. In 1859, significantly the year of the publication of Darwin's *Origin of Species*, three eminent English geologists—Prestwich, Evans and Falconer—confirmed the claim of Boucher-de-Perthes in unqualified terms before the Royal Society, and in 1863 Lyell published his 'Geological Evidence of the Antiquity of Man'.[16]

This revelation had its own repercussions in India. Bruce Foote of the Indian Geological Survey resolved to look out for possible similar traces of 'early human art' in South India in the course of his geological duties. He was immediately rewarded by the find (1863) at Pallavaram, near Madras, of a true palaeolith among the débris of a pit in the laterite gravel (2 to 3 feet thick) overlying the granite gneiss. This was soon followed by the discovery in great numbers of similar artifacts in the gravel beds of the Kortalayar and the Narnavaram rivers near Madras, in the company of his colleague in the Survey, William King.[32]

There were also chance finds by others. In 1865 A. B. Wynne discovered an agate flake near Paiṭhan (Hyderabad, Deccan) on the Upper Godāvarī, and in 1873 C. Hackett found a quartzite hand-axe embedded in a cliff at Bhutra on the Narbadā river, both in association with fossil mammalia, which were duly accorded their proper setting in the Indian Pleistocene by the Geological Survey of India.[65] But finds like these were sporadic. Most of the Indian palaeoliths have come from high-level gravel beds, or older alluvium of rivers, or the laterite formations of the Coromandel Coast.

From the keen interest maintained in this quest by Foote during the forty-three years that followed his first find, he became the unrivalled pioneer in the discovery of the Stone Age in India. His activity in this line comprised the whole of South India, roughly south of a line from Kāthiāwār to Bengal. He built up patiently during this long period a vast index-collection of prehistoric antiquities from this region which, to the credit of the Madras Government, was purchased by them in the first decade of the present century for over Rs.30,000 and located in the Madras Government Museum in a building specially erected for it. He himself arranged it and published two Catalogues in 1914, one on a geographical basis and the other consisting of his own notes on ages and distribution, and these form the *magnum opus* of the Madras Museum.[34, 35]

Foote thus represents a solitary but brilliant response in India to the call of prehistory, as it was then awakening in Europe. A prolonged lull followed, during which the archaeologists of India were engaged almost exclusively with historic civilizations.

A FRESH IMPETUS

A fresh impetus to the moribund Indian Stone Age problem came about a decade and a half ago from Mr. Miles Burkitt of Cambridge. A vast collection of lithic tools from South India in the Kistna basin was placed in his hands by its collector, L. A. Cammiade, in 1930 for interpretation.[7] He discovered an apparent chronological sequence among the industries involved, on lines similar to those recognized in Africa and correlatable to

similar climatic cycles. Two years later he received a fresh collection from the vicinity of Madras from Messrs. F. J. Richards and Cammiade,[8] which was considered in the light of his previous general conclusions. The whole problem of the Indian palaeolithic was thus revived in a new context.

The Yale-Cambridge Expedition (1935), and the correlation of the Indian Stone Age with the Himalayan Ice Age

Meanwhile Dr. Helmut de Terra, who had been working in North-west India in 1932,[39] had discovered stray artifacts on both sides of the Himalayas (Kargil and the Salt Range south of the Potwar plateau in the Punjab). He also saw a palaeolithic collection made in 1930 by Lt. K. R. U. Todd at Pindi Gheb in the valley of the Sohan, a region from which stray palaeoliths had been reported in 1880 and which in 1928 [61] D. N. Wadia of the Geological Survey of India noticed as abounding in primitive palaeolithic artifacts. In such a context De Terra was necessarily led to surmise that the pluvial cycles in South India postulated by Burkitt might be related with the northerly glaciations already noticed in the Himalayan region. The result was the well-equipped Yale-Cambridge Expedition of 1935, led by De Terra in association with Dr. Teilhard de Chardin and Dr. T. T. Paterson, and united for intensive research by the concerted methods of geology, palaeontology and prehistoric archaeology into the Late Cainozoic period in India as it bore on the Stone Age problem.

Two previous expeditions in the north-west Himalayas had given De Terra sufficient geological data to indicate that Kashmir and 'the adjoining plains of the Punjab would yield important information on the relationship of Quaternary glaciations and crustal movements to Early Man and his cultures, of which he had had glimpses in the Pleistocene deposits of the Siwālik region. He therefore undertook in the present expedition the study of the Late Cainozoic in India. On these considerations he chose [29] for this investigation the country extending from the Kashmir Valley across the Pīr Panjal Range and Poonch, to the Salt Range between the Indus and the Jhelum. This sector comprises a slope of the Himalayas and its adjoining Potwar plain in the Punjab, with their more recently uplifted ridges such as the Pīr Panjal and the Salt Range.

Naturally the investigations had to be based on a careful stratigraphical examination of the Pleistocene. The Quaternary Glacial Cycle in Kashmir, already recognized by Giotto Dainelli, provided an ideal means for working out a standard sequence of geological events for the mountainous tract. The glacial and interglacial deposits would then be correlatable with the Late- and Post-Siwālik formations of the adjoining foothills and plains lower down, for dating the artifact-bearing horizons in them. This in turn would enable the checking of the stratigraphical results there obtained against the palaeontological records on which up to now has been based the stratigraphy of the Siwālik formations. Thus the Pleistocene geology centres in Kashmir around the glacial cycle as revealed by every possible evidence—by terminal moraines and by the composite valley slopes or 'terraces' with sedimentary records of both glacial and interglacial stages. The effects of the glacial cycle here are represented by a system of terraces discernible even in non-glaciated regions: not only in the Punjab, but even in Central and South India.

These terraces were the successive habitats of man and his contemporary fauna and therefore include also man's lithic record. Furthermore, they are clear indicators of the main climatic changes and earth movements.[24] Thus in the study of the Stone Age evolution in geographical terms, no features are of such significance as terraces. An ideal key to the understanding of the entire terrace-system of India is furnished in the Kashmir basin.

II. THE ALPINE GLACIAL CYCLE IN KASHMIR

KAREWA SERIES

The Kashmir basin in the Himalayas, 3,600 feet higher than the Sub-Himalayan plain in the Punjab, is a faulted strike valley in the north-western Himalaya drained by the Jhelum river. Flanked by high, partly glaciated mountain ranges, the Jhelum valley has throughout the Quaternary recorded in Kashmir a glacial lake and the fluctuations of a polyglacial cycle. The chief geological formation of the Ice Age here is the huge Karewa Series—a thick stratified (lacustrine) accumulation of silt, clay and gravels, the lower part of which is strongly folded.

Terraces are found mainly in the transverse valleys of the flanking mountains and are clearly exposed along the Vishāv river, a tributary of the Jhelum south of Srinagar and east of Shupian (pl. XIII). The dating of these terraces presupposes an understanding of the underlying Karewa beds which are seen as flat mounds bordering the slopes of the mountains above the modern alluvium of the Jhelum.

On the Himalayan slope, for example, at the outlet of the Sind and Liddar valleys north and south of Srinagar on the eastern side of the Jhelum lake beds are found above and below moraines of the second glaciation. These are respectively known as the Lower and the Upper Karewas.

Underlying the Lower occurs the first strong ice advance, which is recorded in a terminal moraine and a corresponding outwash apron. The Lower Karewas contain at one place (Sombur) vertebrate fossils, and at other places fossil plants. The vertebrate remains with a primitive elephant, *Elephas hysudricus,* indicate an Early (Lower) Pleistocene age and a Late Siwālik fauna. This elephant appears to be restricted to the older Upper Siwālik beds (Tatrot-Pinjor zones) of the neighbouring foothills of the Punjab.

On the Kashmir side the lower of the two Karewas is unconformably overlain by gravel and boulder clay, apparently due to deposition in a lake, as higher up large trough valleys and thick moraines testify to the second glaciation and its great intensity. The boulder fans are more than 300 feet in thickness in places, and they are conspicuous in all geological sections, both in Kashmir and in the foothills on the Punjab side. Preceding the second glaciation was a strong uplift and folding of the Lower Karewa beds which took place at the close of the first glaciation, and this unconformity defines the Lower Pleistocene. In the valley centre they are concealed by a mantle of stratified and, in many places, loess-like silt and sand. These are the Upper Karewa beds. They mark the close of the second glaciation and the beginning of the next interglacial stage, during which the lake was drained by reason of another uplift of the Pīr Panjal range, and the Jhelum valley developed, causing the first terrace on the Upper Karewas.

GLACIAL TERRACES

The first terrace was cut into the Karewa formation by rivers that dissected the soft silts until they reached the underlying more resistant gravel fans. This must have happened before the third ice advance, because its moraines are found at a much lower level, 100 feet beneath the surface of the fans of the second glaciation. Evidently streams could have dissected the Upper Karewa beds of the lake only after it had been drained. And there is evidence of this in the tributary valley west of Srinagar and elsewhere, in the form of a ledge referable to Terrace 1, between the two slopes the upper of which belongs to the Upper Karewas, and below the lower slope the moraines of the third glaciation occur. The lower slope thus belongs to the latter half of the second interglacial and the ledge (Terrace 1) must therefore belong to the earlier half of the second interglacial period.

Terrace 2 is encountered below a prominent slope and in general is not well preserved. However, in three instances its correlation with the terminal moraines of the third glaciation was clear.

Terrace 3 is conspicuous by its great width. Up-stream this terrace cuts into the third moraine, as in the Pīr Panjal mountains, and therefore is erosional (degradational) in origin and has to be placed in the third interglacial.

The fourth glaciation was less effective in Kashmir than the preceding one, and the glacial outwash resulting from it is therefore generally thinner. The corresponding terrace (Terrace 4) lies for the most part 40 to 50 feet above present stream-levels and carries a veneer of loamy silt presumably derived from weathered and redeposited loess.

The fifth and lowest terrace concludes the system and is encountered in most valleys of the Kashmir basin 20 to 30 feet below an erosional slope cut into Terrace 4. It is composed chiefly of a brown loamy silt which corresponds clearly to a late post- (pleistocene) glacial advance, which in turn relates itself as clearly with the youngest and freshest set of small, thin moraines at the highest valley levels on either flank of this basin. Such a dating is supported by the observations that the gravel of the younger terrace is banked up against the slope below the fourth terrace and that both are aggradational in origin.

Thus the Quaternary Terraces 1 to 5 in the glaciated portion of the Kashmir Himalayas have been due to alternating aggradation of stream-levels corresponding to glacial stages (Terraces 2, 4 and 5) and degradation in the interglacial stages (Terraces 1 and 3) aided by interpolated diastrophic uplifts. The terraces therefore begin from the latter half of the second interglacial.

Before De Terra, Dainelli[26] had observed the same four glaciations but he had equated the earliest with the second (Mindel) of the Alps making the fourth a post-Würm advance. De Terra's data make him run all the four glaciations on the pattern of the Alps, his most imperative reason being his find of a primitive elephant in the Karewas of the first interglacial, equatable with the Early Pleistocene (Tatrot-Pinjor) of the Upper Siwāliks underlying the boulder fans in the Potwar region. He completes the parallelism between the Alps and the Himalayas, observing that the terminal moraines of the fourth glaciation in the Himalaya are succeeded by at least two smaller oscillations, recalling the Bühl and Gschnitz advances in the Alps, and that the terrace features equally suggest this correlation.

Along the Tawi river in Jammu, De Terra observed the Boulder Conglomerate (with faceted boulders and erratics) of the Upper Siwāliks merging with a glacial moraine, which he concluded to belong to the second glaciation, as no other managed to proceed as far as their valley outlets to the border of the Punjab plains. Paterson too observed the same relationship at Poonch. This is a cardinal fact through which the Late Siwālik (Cainozoic) history of the Himalayan foothills gets linked with the glacial cycle in the north.[29] It enables us to bring in a wider and more generally applicable scheme of the Late Cainozoic history for both the glaciated and non-glaciated (periglacial) regions, into which the Lower, Middle and Upper Pleistocene divisions of the Siwāliks can be correlated.

STONE AGE EVIDENCE

Traces of the Old Stone Age are as good as absent in and beyond Kashmir, for the few stray flakes found here at Pampur in 1932 and assigned to the Mid-Palaeolithic by Chr. and J. Hawkes, have since 1935 been dated by De Terra to a Proto-Neolithic Post-Glacial industry associated with the fifth terrace. The similarity in technique is ascribed by him to a clear survival of a Mid-Palaeolithic (Sohan) Levalloisean tradition in sub-recent times. The question therefore of the duration of the Palaeolithic depends on geological and archaeological data to be gleaned only in the periglacial Siwālik region of Potwar lower down—

which serves to make Terrace 4 as marking the end of the Pleistocene. Terraces 1 to 4 will therefore be referred to as the Pleistocene terraces.

We may now pass on to the stratigraphy of the Potwar region where the faunistic and archaeological records are complete and coherent.

III. PERIGLACIAL QUATERNARY SEQUENCE IN THE PUNJAB

The Potwar Siwāliks

The age of the Quaternary (Pleistocene and Holocene) formations of India is intimately connected with that of the rich Late Cainozoic fossil mammals, including the anthropoids, found in the Siwālik Series of the Himalayan foothills. These faunas have been investigated from the Siwālik Range below Simla by Pilgrim, Colbert and others during nearly a century. This Series, 3,000 to 4,000 feet above sea level, follows the southern Himalayas from the Bannu plains on the west to the Brahmaputra valley on the east, and takes its name from the Siwālik Hills of the Hardwar region between the Ganges and the Jumna. It includes the Salt Range in the southern Punjab, to the north of which and delimited by the Himalayan foothills lies the Potwar plateau stretching between the Indus and the Jhelum elbow. This plateau is an elevated mass of folded Siwālik deposits which extend north to the Rawalpindi district. De Terra chose this region for his detailed investigation as here alone lithic artifacts had been reported. Also nowhere else in the Potwar is the Pleistocene history so well recorded as along the Sohan river and its tributaries, where the most important feature is the geological relation between the Boulder deposits, the Potwar Loess and the Terraces (fig. 1). The Indus drains this elevated Potwar plain, and it was on the valleys of the Indus and two of its tributaries, the Sohan and the Jhelum, that De Terra's expedition of 1935 concentrated their energies, eventually announcing to the world the existence of a new Palaeolithic culture which was named Sohan, after the tributary (mentioned above) where it was discovered.

In this region the Siwālik formation is a freshwater deposit 20,000 feet thick, ranging in age from the Late Miocene to the Early Middle Pleistocene. What makes the Siwālik history more interesting than ever for the archaeologist is the discovery of prehistoric lithic tools of Early Man in the topmost gravels of the Upper Siwālik formation by De Terra and Paterson in 1935. Since the Pleistocene and its archaeology are connected with the Upper Siwālik sequence itself, it is necessary to outline briefly the Late Tertiary with a view to defining the Plio-Pleistocene boundary as revealed by these strata.

In the Siwāliks the following subdivisions in descending order are:—

(iii) Upper Siwāliks	B.C. Zone	Early Mid-Pleistocene (*Narbadā*)
	Pinjor Zone Tatrot Zone	Lower Pleistocene (*Villefranchian*)
(ii) Middle Siwāliks	Dhok Paṭhān Zone	Upper Pliocene (*Pontian*)
	Nāgri Zone	Middle Pliocene (*Pontian*)
(i) Lower Siwāliks	Chinji Zone	Lower Pliocene (*Pontian*)
	Kamliāl Zone Murree Series	Upper Miocene

So far as the Lower and Middle Siwāliks are concerned, no stratigraphical breaks are scernible. The Chinji beds in the Lower Siwāliks are regarded as Pontian, but there is faunal break between the Pliocene and the Miocene. A significant sedimentary break,

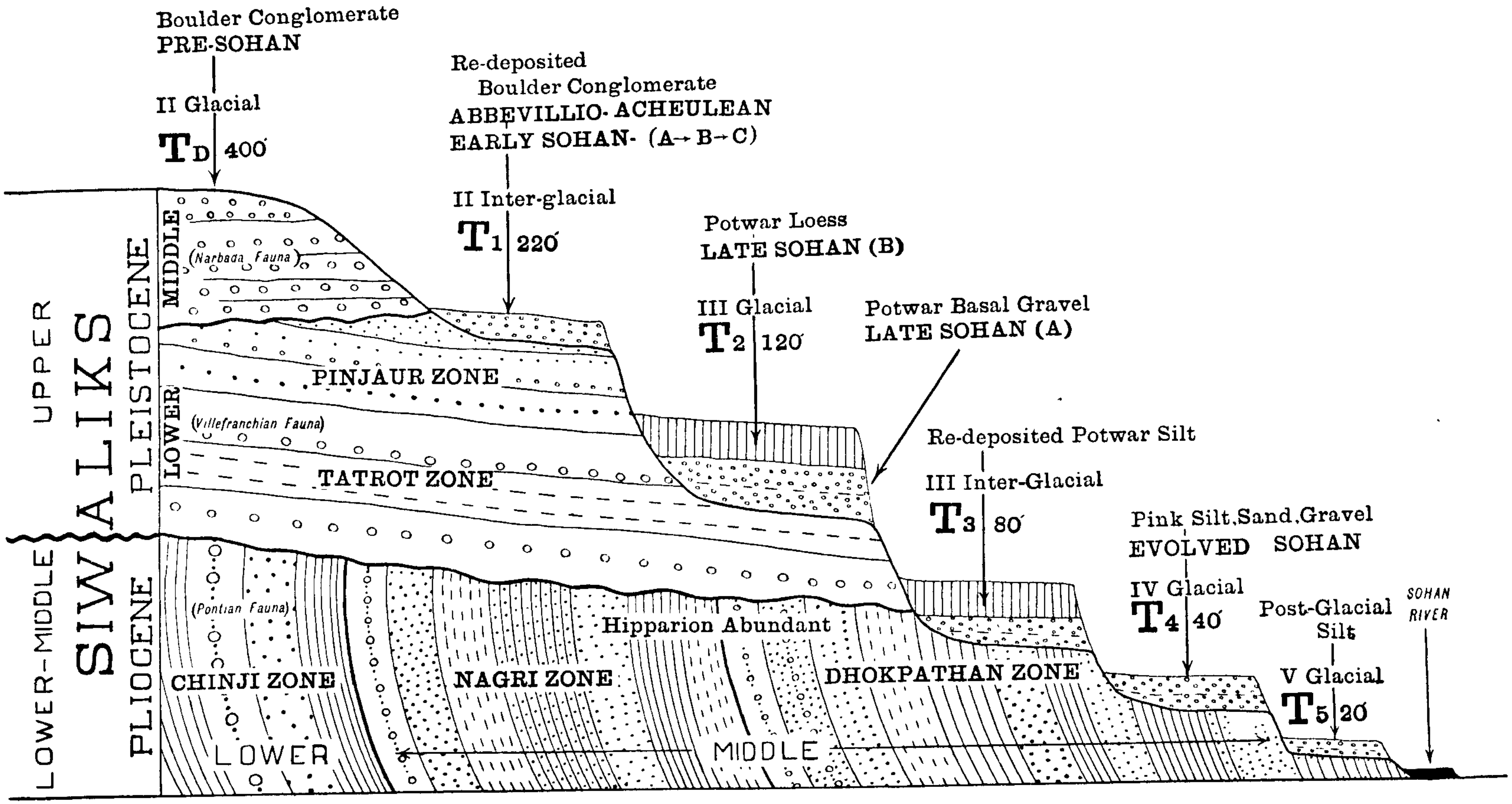


FIG. 1. *Composite transverse section through the Sohan valley, showing the Stone Age sequence in relation to its Pleistocene terraces and the underlying Late Cainozoic Siwālik strata.* (After De Terra and Paterson.)

however, divides the Middle from the Upper Siwāliks, and associated with it there is also a distinct faunal change. This has accordingly been taken by De Terra and Teilhard as the boundary between the Pliocene and Pleistocene periods. It signifies a period of erosion (initiated by the uplift of the Himalaya), as well as change of fauna.

The Middle Siwālik Dhok Paṭhān-Nāgri fauna represents the hold-over of a typically Pontian group of mammals from the Chinji Zone into the Pliocene with certain differences pointed out by De Terra. The abundant Pliocene horse (Hipparion) as well as other grazing animals such as giraffes, antelopes and bovids, which characterize the Dhok Paṭhān, was typical of open and drier plains. Again, fossil anthropoids are more abundant in the Chinji and Nāgri Zones than in the Dhok Paṭhān, and in the earliest Pleistocene (Tatrot beds) they are entirely absent. This fact is very suggestive for the existence of a tropical climate during the pre-Dhok Paṭhān stage of the Siwāliks.

The sedimentary records in which these fossils were preserved substantiate these climatic changes. The Chinji beds are coloured red, indicating tropical chemical weathering due to abundant rainfall and vegetation. The younger Nāgri Zone is pepper-coloured showing lesser intensity of tropical weathering, and the abundant palms indicate sub-tropical conditions. The still grey-coloured sandstones of the Dhok Paṭhān Zone would indicate more arid conditions. All this shows that climate has played a decisive part in the extinction of the Siwālik fauna, and that there was a retreat of the tropical belt from the Himalayan foothills, from what is now the temperate zone.

Plio-Pleistocene boundary

The Upper Siwālik formations can be divided into two faunistic and lithologic sequences or sub-cycles separated by an angular unconformity, which are respectively of Early and Middle Pleistocene age. The former is characterized by the primitive elephants Stegodon, Equus and Sivatherium. The latter sub-cycle or Boulder Conglomerate Zone definitely correlates itself with the second Himalayan Glaciation. The few fossils known in the second horizon indicate a younger type of fauna, as in the Narbadā, in which *Elephas antiquus* (*namadicus*) appears.

The stratigraphic disconformity between the Dhok Paṭhān and Tatrot stages, marks the close of the cycle of sedimentation going on in Potwar from Upper Miocene to Pliocene times. This disconformity has been taken by De Terra and Teilhard, as already pointed out, as the boundary between the Pliocene and Pleistocene on faunistic grounds. In the Tatrot-Pinjor fauna the Hipparion is totally absent and there is a sudden and simultaneous appearance of Elephas, Equus and Bos. This faunal assemblage (*vide* Correlation Table, pl. XIV) is a typical Villefranchian assemblage, a clear break from that of the Pliocene (Pontian) group with its characteristic Hipparion. Here therefore De Terra and Teilhard have placed the Plio-Pleistocene boundary accepting the palaeontological definition of the Pleistocene by Haug in 1911, adopted recently by Hopwood for the entire world, on the basis of this sudden appearance of Equus, Bos and Elephas. This is also in accord with the older definition of the Pleistocene as starting with the onset of glaciation. In north-west India this new faunal immigration in the Tatrot Zone coincided with the onset of glaciation —the culmination of a further deterioration as compared with the Dhok Paṭhān, which in turn was the result of a progressive deterioration that, as we have seen, had started in the Middle Siwāliks from the Chinjis.

Lower Pleistocene

The Lower Pleistocene is further divisible on lithological grounds into two stages—the Tatrot and the Pinjor Zones.

First Glacial (Tatrot Zone):—This Zone has yielded very few fossils as compared with the Pinjor Zone, and this scantiness has been taken to reflect the impact of the glacial climate on the rich mammal fauna of the Siwāliks. This is further substantiated by a soil analysis of this zone made by Dr. Krynne,[26] which indicated the total absence of chemical weathering and was even suggestive of glacial action. Again, the coarseness of the deposit, 1,000 feet thick, must have required powerful streams and abundant rainfall. Also the Pinjor elephant has been equated to the Lower Karewa formation in Kashmir, where a similar elephant (*Elephas hysudricus*) was encountered. Thus palaeontological and geological grounds and soil-analysis all combine to correlate the Tatrot Zone of the Upper Siwālik with the first glaciation of the Kashmir region. On this basis the first Himalayan Ice Advance is referable to the beginning of the Pleistocene with the advent of the new immigrant Villefranchian fauna.

The first Interglacial Period (Pinjor Stage):—Faunistically this zone is inseparable from the lower Tatrot zone, but lithologically the two are different. The underlying Tatrot gravel is of grey colour, whereas the upper Pinjor is composed of pink silt and sands. This colour-change has been taken to indicate climatic changes analogous with a similar interglacial succession in Kashmir, where the pre-Karewa fans of the first glaciation are overlain by the Lower Karewa lake beds. Most elements of the fauna of the Upper Siwāliks are found in this Zone but not in the Boulder Conglomerate or the Tatrot stages. As in the case of the Pinjor deposits, the Lower Karewas contain loessic material indicative of monsoon conditions such as would obtain during an interglacial stage. On this evidence this zone will correlate itself with the first interglacial, and the absence of anthropoids would point to a subtropic climate for this stage.

Middle Pleistocene and Terrace Formation

Second Glacial Period (Boulder Conglomerate Stage):—The boundary between the Pinjor and the final stages of the Upper Siwālik Boulder Conglomerate is marked by an unconformity caused by folding and erosion. In the mountains, this uplift was accompanied by glaciation. Here erosion was severe, leading to widespread deposition of thick fans of boulders in the plains and the adjoining foothills, indicating intensive pluvial conditions. These deposits are known as the Boulder Conglomerate Zone of the Upper Siwāliks. De Terra and Paterson have independently proved that the Boulder Conglomerate merges with the moraines of the second glaciation. This provides the key for the correlation of the late Upper Siwālik Zone with the glacial cycle established in Kashmir, as it was only during the second glaciation that the valley glaciations of the Himalayan foothills reached their outlets on the borders of the Punjab plains. This correlation is important for the dating of the terraces in the Sohan valley and those in the plains and the hill tracts. The faunal record of this zone is very poor, but the presence of *Elephas namadicus* here indicates a fauna younger than the Early Pleistocene of the Pinjor and similar to that of the Narbadā and Godāvarī valleys which are unmistakably of Mid-Pleistocene.

In the topmost gravels of the Boulder Conglomerate the first true prehistoric tools of Stone Age Man appear in eleven localities in the Punjab. This industry has been named the 'Pre-Sohan'. The tools are made of crude split pebbles and large flakes of quartzite, chipped on one side mainly, with large bulbs of percussion, small striking platforms and marginal flake scars. Their age is assigned to the last phase of the second glaciation. So far, there is nothing comparable to this industry from anywhere else in Asia.

Second Interglacial Period (Terrace 1):—The Boulder Conglomerate Series of the Potwar is tilted, and into the Boulder fans of the late Siwālik age is cut the first terrace, suggesting the beginning of the present drainage pattern. The crustal movements which

CORRELATION OF QUATERNARY SEQUENCES IN INDIA BASED ON ICE AGE CYCLE IN N. W.

AGE		FORMATION	N. W. PUNJAB (POTWAR AREA) STAGE	STONE AGE CULTURES	FAUNA	CLIMATE	KASHMIR VALLEY (HIMALAYAN) GLACIAL CYCLE	NARBADA VALLEY STAGE	STONE AGE CULTURES	FAUNA	CLIMATE
HOLOCENE	(*Post-Pleistocene*)	↑ TERRACES ↓	Post Glacial Silt *DEPOSITION* T_5	CHALCOLITHIC Mohenjo Daro Amri NEOLITHIC — Uchali in Potwar PROTO-NEOLITHIC — Chitta Industry Sukkur and Rohri — Microlithic Industry	Present Types	Present Conditions	NEOLITHIC — Megalithic site at Burzahom PROTO-NEOLITHIC — {Nunar, Sombur, Pampur} (V) Post-Glacial *DEPOSITION* T_5	*COTTON SOIL* Silt	PROTO-NEOLITHIC — Microlithic (*Mesolithic*)	Present Types	Pluvial
PLEISTOCENE	UPPER		Pink clay Sand and Gravel *DEPOSITION* T_4	Dhok Pathan, Pindi Gheb → EVOLVED SOHAN ↑	Horse Bison	Cool temperate Pluvial.	(IV) T M 8000′—10,000′ *DEPOSITION* T_4	*UPPER GROUP* Pink clay	LATE SOHAN ↑	*NARBADA FAUNA* Equus namadicus Bos namadicus El namadicus H namadicus Rhinoceros Bubalus palaeindicus Cervus	Pluvial
			Redeposited Potwar Silt, Second Loess EROSION T_3	↑	Camel	Interpluvial	III EROSION T_3	Sand EROSION	LATE SOHAN ↑		
			Potwar Loess Potwar Basal Gravel *DEPOSITION* T_2	LATE ACHEULEAN ↑ — LATE SOHAN (B) ↑ LATE SOHAN (A) ↑	Wolf	Cool temperate Pluvial.	(III) T.M. 6500′. *DEPOSITION* T_2	*LOWER GROUP* Pink clay	LATE ACHEULEAN ↑ — EARLY SOHAN ↑		Pluvial
	MIDDLE		Redeposited Boulder Congl High Gravel Terrace in Sohan Valley EROSION T_1	ABBEVILLIO--ACHEULEAN *Hand axe* — EARLY SOHAN (A→B→C) *Chopper* *Flakes*	*FAUNA*	Long Erosion Interval Interpluvial Long Dry Period	(Lake cut=Jhelum comes in) II UPPER KAREWAS EROSION T_1	Conglomerate EROSION	ABBEVILLIO-ACHEULEAN *Hand axe* — EARLY SOHAN *Chopper Flakes*		
		UPPER SIWALIKS 5000′ — 7000′	B·C·ZONE = T_D Boulder Conglomerate. Fans and Terrace Gravels with erratics	PRE-SOHAN Worked flakes = Cromerian Pre-Abbevillian	*NARBADA* El. namadicus (few fossils known-definitely younger type of fauna	Cold periglacial condition Torrential rains Pluvial	Karewa, boulder clay, and gravel fans (II) →MINDEL GLACIATION	?	?	?	Subtropical.
	LOWER		PINJAUR ZONE Pink silt, sand and concre-tionary clay.	?	*VILLEFRANCHIAN FAUNA* Equus Bos acutifrons Boselaphus Bubalus. El. planifrons= (Archidiskodon= El meridionalis). Stegodon Sus hysudricus Rh. sivalensis Hexaprotodonsivalensis Sivatherium giganteum (*HIPPARION*) X	Warm temperate. Interpluvial	I LOWER KAREWAS Elephas hysudricus Birch, Oak, Pine Forest.	?	?		
			TATROT ZONE Grey Conglomerate S.S. and Silt.			Cool temperate. *Chemical* weathering absent. Pluvial	Malshahibagh Conglomerate (I) Lowest moraines and fans T.M. 5500′.	LATERITE			Tropical
PLIOCENE	UPPER	MIDDLE SIWALIKS 6000′	DHOKPATHAN ZONE Coarse grey S. S. but no bright red colouring.		*PONTIAN FAUNA* Hipparion abundant. Dryo. Palaeo. Rama-pithecus.	Cold arid Sub-tropical	X	X			
			NAGRI ZONE Pepper coloured S.S..		Siva. Dryo. Hylo. Sugriva. Palaeo-pithecus. (Ruminant fauna). *Progressive Anthropoids*	Tropical					

( ) = GLACIAL ～～～ = Major breaks generally marking crustal disturbances. X = Missing T.M.=Terminal Moraines above sea level (*Based on the Results of the Yale-Cambridge Expedition of 1935*)

tilted and folded the Boulder Conglomerate beds contributed to the dissection of the Potwar peneplain, and prolonged erosion during this period gave rise to Terrace 1, a degradational terrace 220 feet above the level of the stream in the Sohan valley and 410 feet in the Indus. In Kashmir also a similar set of causes brought in the equivalent to Terrace 1. Associated with the thin gravels (re-deposited Boulder Conglomerate) of this terrace, Early Palaeolithic implements are found which are recorded in two major facies of equal antiquity, one an Abbevillio-Acheulean handaxe (similar to the Madras Industry and prevalent in South India) and the other an 'atypical' complex of pebble and flake tools which De Terra has christened the Sohan culture. That these were not washed out from the Boulder Conglomerate or any other Upper Siwālik deposits is shown by their absence in these horizons. Nothing is known about the fauna of Terrace 1 but De Terra has on archaeological grounds equated with this terrace the fauna of the Narbadā region, where also handaxes and Sohan implements are found associated with the Mid-Pleistocene horse, buffalo, straight tusked elephant and hippopotamus.

Upper Pleistocene

Third Glacial Period (Terrace 2):—This terrace 120 feet above the Sohan river is aggradational in origin and contains two distinct stratigraphic horizons, (i) a basal gravel and (ii) an overlying mass of yellow loessic silt commonly occurring in this terrace. At places it reaches a thickness of 350 feet. It is also known as the 'Potwar Loess' from its widespread mantle-like occurrence here, at places independent of any physiographic obstacles. In the Potwar region near Rawalpindi and Poonch the second glaciation was followed by a long erosion-interval, which in turn gave place to the deposition of a thick series of loessic silt. This Potwar formation covers the older relief into which Terrace 3 was cut during the third interglacial. Terrace 2 therefore comes out as a third glacial aggradation, homotaxial with the third glacial gravel of Kashmir—a conclusion strengthened by the circumstance that this terrace can be traced in the tributary valleys leading from the plains to the foothills as far as the terminal moraines of the third glaciation.

The Potwar loess contains fossil remains of a fauna which, on comparison with that of the Siwāliks, appears scanty and impoverished. It conveys, however, a picture of the land as being semi-arid and inhabited by horse, bison, camel and wolf.

Implements of phase A, of Late Sohan Culture, are found in many localities of the Potwar Basal Gravel. The later phase B implements of the Late Sohan are found in the lower 20 feet of the silt at numerous places. This phase of the Sohan reveals a strong Levalloisean influence already apparent in Late Sohan A. In some sections the Potwar silt is tilted, reminiscent of another diastrophic phenomenon.

Third Interglacial Period (Terrace 3):—This last interglacial or interpluvial period was a long period of erosion recorded by a degradational terrace (80 feet high in the Sohan) formed by the dissection of the Potwar Loess. It is intermediate in height between Terraces 2 and 4, and in the Upper Sohan valley and in the Indus valley below Attock, the third terrace is well developed. This same erosional stage is found regionally in Kashmir, Poonch and Jammu in the Punjab foothills, where it seems patent, within the entire sequence of terraces, that it originated during the third interglacial period.

Fourth Glacial Period (Terrace 4):—This represents the aggradational stage contemporaneous with the fourth Ice Advance and is composed of pinkish loam, sand and gravel. A prominent slope 30 to 40 feet high between Terraces 3 and 4 must have resulted through an uplift during Upper Pleistocene times. In Kashmir also Terrace 4 is an aggradational terrace but consists of gravels. This terrace closes the Pleistocene in the Potwar region, and is 40 feet high in the Sohan and 90 feet in the Indus. Presumably the Late (Upper) Palaeolithic industry from Pindi Gheb and Dhok Paṭhān, a Later or 'Evolved Sohan',

may be assigned to this terrace; that is to say, the Lower Palaeolithic Sohan tradition persisted in the Punjab into the fourth glacial period.

HOLOCENE

Post-Pleistocene (Terrace 5): about 20 feet above the present stream level there is a fifth terrace, aggradational in origin. It is composed of silt, and De Terra observes that it belongs to the fifth Ice (Post-glacial) Advance in the mountains.

Furthermore, overlying the deposits of Terrace 4 is a thin veneer of silt of apparently eolian origin which contains culture layers at depths exceeding 100 feet, containing charcoal, broken bones and pottery. Skeletal remains of *Homo sapiens* of dolicocephalic type were found by De Terra with neolithic funerary pottery in a yellow loess, that overlies Potwar silt in the Central Salt Range and at Uchali west of Naushera. The presence of pottery and late palaeolithic implements indicate a time-range for the deposits from late Pleistocene to recent times, and that it is in this stage that one has to look for the transition between the palaeolithic and neolithic cultures. Microliths made of brown jasper or flint were collected by De Terra from the Potwar Loess surface, which seems to have been derived from a fossil soil of sub-recent origin.

SEVEN STAGES OF THE PLEISTOCENE

Thus all the five terraces could be followed from the glacial tract of the Kashmir Himalayas to the Potwar plain below and in other streams descending from the Himalayan ranges. The concomitance of gravel-accumulations in the glaciated and non-glaciated regions of N.W. India is one of the most striking features of the Pleistocene. Terraces 2 and 4 find their counterparts in the aggradational glacial deposits of Kashmir; Terraces 1 and 3 correspond to the interglacial erosional stages. These facts demonstrate that generally there seems to be an equation of the pluvial and inter-pluvial periods of the peri-glacial Potwar region with those respectively of the glacial and interglacial in the mountainous tracts of Kashmir. This delicate balance between climate and cycles of sedimentation has been summarized in a formula by Dr. Movius[46]:—

(*a*) Cold conditions→Glaciations→Deposition on the Plains

Moraine I	→	Tatrot Gravels
Karewa fans	→	Boulder Conglomerate
Moraine Terrace 2	→	Potwar Gravel and Silt of Terrace 2
Moraine Terrace 4	→	Silt of Terrace 4

(*b*) Warm temperate conditions→deglaciation→Erosion on the plains

Upper Karewas	→	T_1 Erosional
III Interglacial	→	T_3 Erosional.

Thus both on geological and faunal analyses, and from terrace records enclosing archaeological evidence, the tripartite Pleistocene Period becomes divisible into seven stages as follows:

Upper Pleistocene	Terrace 4 Loam and Silt	IV *Glacial = Würm*
	Terrace 3 Erosion Period	III Interglacial
	Terrace 2 Potwar Loess	III *Glacial = Riss*
Middle Pleistocene	Terrace 1 Erosional Period	II Interglacial
	Boulder Conglomerate	II *Glacial = Mindel*
Lower Pleistocene	Pinjor	I Interglacial
	Tatrot	I *Glacial = Günz*

IV. ARCHAEOLOGICAL EVIDENCE OF THE OLD STONE AGE IN POTWAR

General features

The activity of Stone Age Man in this region is shown by the abundance of palaeolithic and neolithic tools found in or on terraces. The material of the palaeolithic tools is in all cases quartzite, and the Potwar region has an abundant supply of this in the Mid-Pliocene conglomerate. The neolithic tools are of trap or porphyry. So far no sure human artifacts have appeared in the Early Pleistocene beds of the Potwar plain ; occasional simulations of human workmanship have been accounted for by weathering agencies, thermal fracture and wind erosion. Human records begin in the Boulder Conglomerate Stage at the close of the second glaciation and are confined to certain stratigraphic horizons younger than those containing the Upper Siwālik or Villefranchian fauna, that is, the Middle to Upper Pleistocene terraces.

The Palaeolithic culture of this region exhibits two main traditions of equal antiquity developing side by side. One of these is the handaxe tradition which shows close affinity with the Madras Industry and is also related to the European or African *coup-de-poing* core-industries.

The other tradition is styled the Sohan Culture, consisting mostly of flakes with some characteristic pebble tools. Typologically this latter industry is styled a 'flake industry', essentially Clactonian with Levallois influence. Just as an evolutionary trend to neater and finer forms in the Abbevillio-Acheulean culture is observed, so also the Sohan culture exhibits a progressive typological development. Movius has recently shown that the Sohan culture is to be regarded as one manifestation of a great complex of chopper-chopping tool cultures found by him in the Southern and Eastern Asia.

The archaeological sequence, as worked out by De Terra and Paterson, of the Stone Age Industries in this region is as follows:—

Pre-Sohan Industry

This, the earliest lithic industry in India, consists of large flakes derived from crude split pebbles worked on one side only. They occur near the top of the Boulder Conglomerate. All of them are rolled, denoting that 'they were made while the conglomerate was still in process of deposition'. The flakes (fig. 2), typologically similar to the

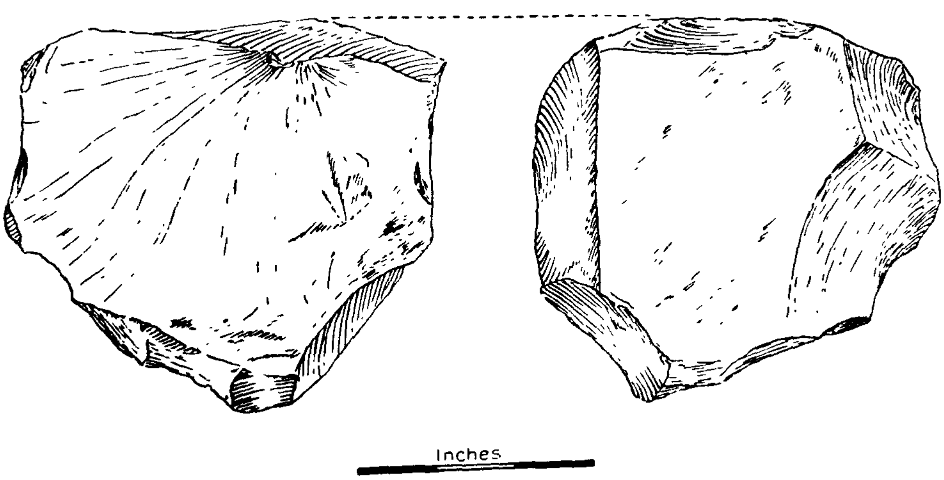


Fig. 2. *'Pre-Sohan' flake from the boulder conglomerate at Kallar.* (After De Terra and Paterson.)

Cromerian of England, are big and very worn, with large, plain unfaceted striking platforms making high angles (100 to 125 degrees). The bulbs are flat but the cones are large and well developed. The upper surface is usually unflaked except for occasional marginal scars. There is no secondary working but the edges are battered either by nature or by utilization. This industry has been found only in Potwar, that is, S.E. of Rawalpindi, Malakpur, Adiala, Chauntra, Kallar (Sec. 4),* Chaomukh (Sec. 8), Jammu and Malakpur.

The term 'Pre-Sohan' is used by De Terra with a purely chronological connotation for the Boulder Conglomerate Industry of the second glacial period, so as to make it unsuggestive of any genetic or derivative connection with the succeeding 'Early Sohan' culture which begins in the second Interglacial of Terrace 1.

Early Sohan Industry

This is a series of pebble and flake implements collected in the Sohan basin and along the Indus river (from Attock to the junction with the Sohan), on the surface of the Boulder Conglomerate and Terrace 1. The age of the Early Sohan (fig. 5) is ascribed to the later part of the second interglacial stage of Terrace 1 as rolled forms of Early Sohan are found in the basal gravels of Terrace 2.

On grounds of patination and state of wear, this group is divided into three stages termed A, B and C. The earliest, A, is heavily patinated and thoroughly worn, B is deeply patinated like A but not worn, and the youngest, C, is less patinated and fairly fresh. The three stages are characterized by a variety of (chopping and scraping) pebble tools, associated with a comparatively small number of flakes which increases in later stages. From the earliest to the latest stages there is a typological developmental trend (which cannot be based on stratigraphy) towards smaller and neater forms of the various tool types. These tools fall into two categories—pebble tools and flake tools. The pebble tools are again subdivided into two sub-types, (1) 'flat-based' and (2) 'rounded'-pebble tools.

The flat-based variety (fig. 5, 1–4) has a flat side produced by natural cleavage or artificial breaking. From this surface flakes are struck off towards the upper rounded surface so as to form a steep cutting edge. It is not known whether they were used for chopping or scraping. In the second 'rounded pebble' variety (fig. 5, 5–11) the shape of the tool is dependent on the shape of the pebble (flattish-oval or spheroidal). The flakes are struck from the original pebble surface not from any platform, natural or prepared, as in the former case. The cutting edge is worked on one side only, which produces a scalloped cutting edge. When the flaking is all round the periphery, it gives rise to highly evolved cores.

The same type of pebble tools is found in all the three groups of the Early Sohan but there is a tendency from group to group to produce neater and finer implements. No flakes were found in Group A. In Group B there are flakes also. They also possess unfaceted platforms with little retouch. Primary flaking of the upper surface is crude, often retaining the pebble cortex. Step-flaking is common. The general impression is that this industry, viewed apart from the great number of its pebble tools, has a resemblance to the Early Clactonian of Europe. In Group C the commonest pebble tool is flattish with flaking on one surface half way around the periphery. A development of this form is a discoidal core flaked all over one surface, and is characteristic of this Group (fig. 5, 12–16). These resemble the Clactonian forms and also the Early Levalloisean (fig. 5, 23, 24, 27).

Corresponding to the two types of Clactonian and Levallois cores there are two kinds of flakes without any signs of retouch. Those with high-angled plain platforms,

* The numbers of the sections refer to De Terra's sections.

Clacton-like, are more in number and similar to those in B, but flatter and neater on the whole and with a great amount of primary flaking (fig. 5, 17–21). A few have low-angled simple faceted platforms, suggesting a Proto-Levalloisean influence (fig. 5, 22, 25, and 28). Retouch is absent but some show marginal chipping due to utilization.

The Early Sohan sites are found in the valley of the Sohan at Adiala, Khaslakalan, Chauntra and Trap near the junction of the Sohan and the Indus rivers; also in the Indus valley at Ghariala at the confluence of the Haro and the Indus, at Khushalgarh, Makhad and Injra.

The Madras Industry (Abbevillio-Acheulean)

Attributable to the same second interglacial age (of Terrace 1) as the Early Sohan is another industry of equal antiquity but of a different tradition, known as the handaxe complex (figs. 7 and 8). Typologically this is similar to the Lower Palaeolithic Abbevillio-Acheulean (biface) series observable in Peninsular India, with its primary focus at Madras. This has been demonstrated by De Terra in a section near Rawalpindi where on a conglomerate of the remnant of Terrace 1, he found rolled, crude handaxes of Early Acheul type. Again at Chauntra crude heavily rolled forms of Abbevillian handaxe occur in the basal gravels of the third phase with fresh Late Acheul types, pointing to its earliest appearance in the second interglacial. The stratigraphic position of the *Madras* (handaxe) *Industry* immediately between the loessic formation of the third glacial and the Boulder Conglomerate makes it possible to date the Abbevillio-Acheulean culture in the Cis-Himalayan region as early second interglacial.

The tools comprise handaxes, cores and flakes. These are better described under the Late Sohan sequence, as they occur together in the same stratigraphic horizon. No sites of this industry have been recorded from the Indus region. The handaxe in the Sohan valley occurs at 4 places; S.E. of Rawalpindi (Sec. 5); Adiala (Sec. 10), Chauntra (Sec. 15) and at Balwal near Chakri (Sec. 16).

Late Sohan Industry

This is of third glacial age of Terrace 2 period. It has two phases A and B, stratigraphically different, A occurring in the basal gravels of the Potwar, (the later) B coming from the Potwar Loess above the gravels. Its genetic relation with the Early Sohan is shown by the survival of the pebble tools and a similar flaking technique as obtains in the Early Sohan.

(1) Late Sohan A: The pebble tools here show a large variety but they are all better made than, and clearly developed from, the Early Sohan. They are associated with a far greater number of flake tools (fig. 6) than in Early Sohan and corresponding cores, the flake element being distinctly Levalloisean in technique with the Clacton flakes still prominent. Both flake assemblages have left corresponding series of cores. The retouching of the flake tools is comparatively small.

(2) Late Sohan B is found in the lower part of the Potwar silt in the form of regular workshops not far above the basal gravel, denoting its relationship to Late Sohan A. The tools are exceedingly fresh and in this there is no admixture of Abbevillio-Acheulean handaxes. This indicates the survival of the Sohan tradition long after the biface industry had become extinct. Although pebble-choppers and cores are present as in A, this phase consists in the main of flakes and blades. Almost half of the flakes have faceted platforms without any signs of retouch. The rest are mostly blades or elongated flakes (fig. 6). This phase shows a general resemblance to the Late Levalloisean of Europe.

The Late Sohan is very widespread, occurring even as far as Simla. It is found in Potwar in a number of places of the Sohan valley, described in detail by De Terra in the following sections:—4, 5, 6, 7, 8, 10, 11, 14, (Chauntra) 15, 16 to 19. It is also seen in Poonch at Kotli and at Rhotas near Jhelum and in the Salt Range at Kohli and Dhokgul.

CHAUNTRA INDUSTRY

Section 15 at Chauntra is in many respects the most important locality from an archaeological point of view in the Sohan valley. This is the only site in the Punjab which shows a parallel development of the Madras (handaxe) industry of the south with the Sohan flake and pebble industries. The precise dating of this site has not been definitely established. The industry was obtained from the gravels of the third glacial age. It consists of a mixture of Abbevillio-Acheulean and Sohan elements and has been divided into three groups on the basis of the state of preservation, which is confirmed by the typology of the tools themselves. Thus Group A is the oldest group, completely worn. It includes handaxes of (very primitive) Abbevillian type with large pebble cores and one or two massive flakes of Pre-Sohan industry. The next Group B is less worn, and handaxes and cleavers show neater flaking recalling Lower to Middle Acheul types. In the latest and youngest Group C the tools are fresh and unrolled. Late Acheul handaxes (cordate, pyriform and pointed ovates) exhibit trimming and controlled step-flaking (fig. 7, 14). These handaxes are associated with discoidal cores, a few faceted flakes and a solitary blade of the Late Sohan. Thus in the youngest division of Group C is found the persistence of the handaxe complex of the Madras Industry until Late Sohan times.

De Terra's geological interpretation of the site makes the rolled Abbevillian types in the oldest Group A to belong to Terrace 1 age of the second interglacial period. As this terrace was subsequently denuded, its artifacts had been washed out and had been redeposited in basal gravels of the younger one (Terrace 2) that underlie the loessic Potwar silt of the third glacial period. There is no way of determining which, if either, was the earlier in the Sohan valley—the handaxe or the Sohan industry—in this Old Palaeolithic complex. Both are, however, certainly later than the Upper Siwālik Boulder Conglomerate. Thus for the first time in Asia Early Palaeolithic handaxe industries were discovered in N.W. India in association with datable Ice-Age gravels.[22]

'EVOLVED SOHAN' (LATE-UPPER-PALAEOLITHIC)

At Dhok Paṭhān, a few miles from Pindi Gheb, a site of unknown age was discovered by Todd in 1932. The pebble tools and the discoidal cores are identical with the Sohan series, and the flakes with convergent and parallel primary flaking are similar to those of Late Sohan A. Paterson puts this industry as 'fairly late' and, at the earliest, contemporary with the Late Sohan or possibly even later. De Terra correlates it with Terrace 4 of the fourth glacial age, as on its surface occur tools presumably representing a late (Upper) Palaeolithic industry (Pindi Gheb and Dhok Paṭhān).[26] The term 'Evolved Sohan' is assigned by Movius to this industry.

V. THE PLEISTOCENE IN CENTRAL (TROPICAL) INDIA

THE NARBADA SEDIMENTATION CYCLES

There are Pleistocene formations in several river basins in Central India but very little is known of the existence of river terraces in them. In order to compare the facts of the Pleistocene stratigraphy and prehistory obtained in the Himalayan region with the

Peninsular Pleistocene, De Terra chose the Narbadā region as its valley proved very promising for its wealth of Pleistocene mammal fauna and for the palaeoliths reported from here by Hackett at Bhutra in association with an extinct fauna. He confined his investigations between Hoshangābād and Narsinghpur where Theobald in 1860 had studied the Pleistocene sequence. The Narbadā beds which he considered of Pliocene age were assigned to Pleistocene times by Pilgrim in 1905. De Terra here proved the association of Early Palaeolithic handaxe and flake industries with a Mid-Pleistocene type of fauna (*Elephas antiquus-namadicus*) thereby supplementing his data for Potwar, where such correlation had to be based on other than palaeontologic evidence.

De Terra disclosed the existence of four terraces in the tributary valleys of the Narbadā near Harpur [24] though in the main valley it was impossible to distinguish them. But there are three different cycles of sedimentation discernible in the ancient alluvium in both the main and the tributary valleys, which shows that during similar Quaternary stages the main valley acted as collecting basin for the same types of sediment as in the terraces of the tributary.

In this ancient alluvium the three different cycles of sedimentation containing gravel, sand and silt in each are: (1) the Lower Group, (2) the Upper Group and (3) the Cotton-soil or *regur* Group. All these three cycles are exposed to a depth of 130 feet in the Narbadā valley (fig. 3) as a terrace between Hoshangābād and Narsinghpur, and at other places it

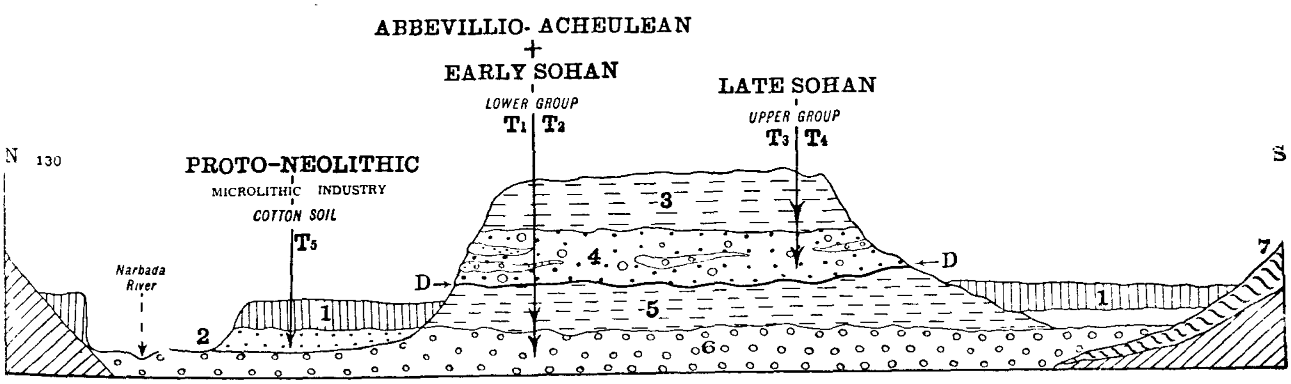


FIG. 3. *Transverse section through the Narbadā valley near Narsinghpur: 1, 2, COTTON SOIL GROUP with Cotton Soil (1) and a Basal Gravel of Cotton Soil (2); 3, 4, UPPER GROUP with Pink Clay (3) and Upper Gravel and Sand (4); 5, 6, LOWER GROUP with Pink Concretionary Clay (5) and Lower Basal Conglomerate (6); 7, Laterite; D-D disconformity between UPPER and LOWER GROUPS. Cultures correlated with the Potwar (Sohan) terraces.* (After De Terra and Teilhard.)

appears to be more than 500 feet thick (as disclosed by borings) with no trace of the bed rock at that depth even. In addition to all these three groups, and underlying them all, is a laterite bed near Hoshangābād which in all makes four stages. Among them there are three disconformities testifying to three long periods of erosion.

The age of the three stages of the Narbadā alluvium, with these three stratigraphic breaks, has been based upon the correlatable similarity of gravel zones in terraces with their archaeological records, here and in the Potwar region. In support of this correlation De Terra observes that similar archaeological records could not have appeared in both these regions at different intervals.

The Old Alluvium (Lower and Upper Groups)

Each of the Lower and Upper (Narbadā) Groups begins with a basal gravel overlain by pinkish or orange-coloured concretionary clays and silts. There appears to be no perceptible change in the fauna of both the Lower and Upper Groups but both are definitely Mid-Pleistocene assemblages of Eurasian forms.

The Lower Group:—In this group (*age:* Terraces 1 and 2) the basal conglomerate is coarser and more cemented, the clay is more intensely coloured and also richer in concretions, than the Upper Zone. The conglomerate is devoid of any traces of lateritization. Fossil mammals begin at the base of the Lower Group and so does the archaeological record of Ancient Man. At Umaria and Hoshangābād from the base layer 4 near the disconformity which separates both zones remains of *Bos namadicus, Elephas namadicus, Hexapratodon* and *Bubalus* were extracted.

If the two groups exhibit no faunal change, the archaeological contents, however, of the two horizons are very noteworthy. From highly cemented basal gravels of the Lower Group De Terra chiselled out large flakes with prominent bulbs reminiscent of the Pre-Sohan industry of the Boulder Conglomerate Zone of the Potwar, in addition to Abbevillian and Acheulean handaxes and cleavers and cores and flakes of Early Sohan types, most of which were heavily rolled.

On the other hand, from the red concretionary clay and silt overlying the basal conglomerate a fresh Upper Acheulean biface and several unrolled flakes were collected by him. As the Lower Group had yielded both unworn and rolled Acheulean tools with heavily rolled Abbevillian handaxes and flakes of Early Sohan, it would make the Acheulean industry contemporaneous with the deposition of the basal conglomerate. This horizon thus marks the upper limit of the Acheul industry. A similar archaeological record with the true Acheul and Early Sohan horizon is roughly synchronous in the Punjab with Terraces 1 and 2, and therefore the same age becomes assignable to the Lower Narbadā, Terrace 1 corresponding to the basal conglomerate and Terrace 2 to the (younger) pink concretionary clay.

The Upper Group (*age:* Terraces 3 and 4):—The basal gravels of the Upper Group are less coarse and less cemented than those of the Lower. Above this lies again a thick clay bed, less red and poorer in concretions than the older clay. From the vicinity of Narsinghpur in both horizons of this Group was collected a typical Mid-Pleistocene fauna. As in the Lower Group so in the Upper, there are two distinct industries both apparently derived from the Lower. But one of these, the biface industry, is Acheulian and *rolled*, pointing to redeposition from earlier gravels of the Lower Group. The other industry, which is *fresh* and unrolled and therefore contemporary with the Upper Group, consists of a characteristic assemblage of fresh flakes, discoidal and pebble cores of quartzite and trap. These typologically fall within the range of the Late Sohan industry of the north, apparently evolved from the Early Sohan of the Lower Narbadā. The Upper Group which is Late Sohan and free from biface culture may therefore be regarded as synchronous with the culture of Terraces 3 and 4 in the Potwar. The age of Terraces 3 and 4 becomes therefore the age also of the Upper Group, Terrace 3 corresponding to the gravel and Terrace 4 to the succeeding pink clay.

The New Alluvium

Cotton-soil (*age:* Terrace 5):—Above the Upper Group there is a sharp break in the sequence of the Pleistocene beds, and a new cycle of deposition of soft sands and gravels gives rise to the lowest terrace in the Narbadā. This is the *new alluvium* with which is equated the brown silty clay (loessic product) known as *regur* or Cotton-soil, and it would correspond to Terrace 5 of the Punjab. In the basal gravels and sands and in the lower few feet of *regur-*

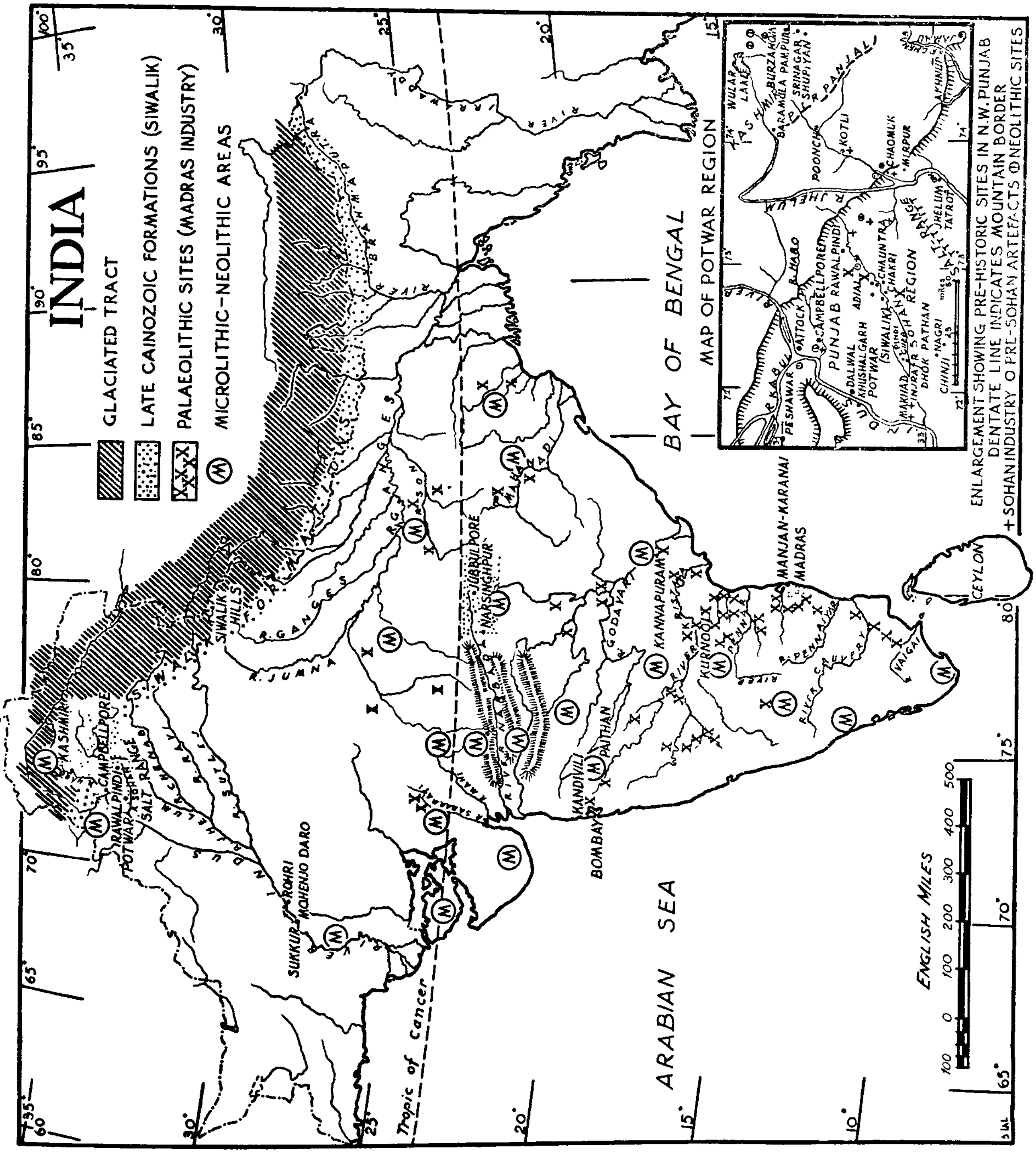


FIG. 4. *Distribution of Stone Age sites in India*

clay De Terra and Teilhard found a flake industry dominated by small blades and scrapers, homologous with Mesolithic culture. These tools are made of flint, chalcedony and jasper, the material comprising the gravels. Their technique and the choice of semi-precious material and the absence of handaxe and cores made De Terra name this *microlithic* industry, with its typological relationships to the Capsian of Syria and Africa, 'proto-Neolithic' or even a late industry that may have flourished in relatively recent times, similar to what is found in the rock-shelters near Hoshangābād and elsewhere.

In view of the absence of clear terrace records in the Narbadā region, it is not possible at present geologically to establish the concomitant individual synchronizations suggested here on archaeological grounds between the successive soil zones of the Narbadā with the terraces of the Punjab. But these sequences are not without some geological support. The three main erosion periods (disconformities) in the Narbadā have their counterparts in the Punjab between Lower Pleistocene and Boulder Conglomerate, between the Boulder Conglomerate and Terrace 1 and between Terrace 2 and Terrace 3. Even the aggradational stages Terraces 2 and 4 have their counterparts in the pink clays of the Narbadā.

Thus De Terra's expedition of 1935, in correlating the Pleistocene in his three main fields of investigation in Upper India (fig. 4) far away from each other, brings out a uniform stratigraphic pattern in the sequence of terraces in the later part of the Quaternary, dictated by both climate and diastrophism. The evolution of Stone Age Man is in all the three regions interwoven into this cyclical pattern. This time-scale and the correlation provided by De Terra open up new perspectives for the Pleistocene geology of India and its human prehistory. There being no glaciation in tropical (Peninsular) India the dating of the Stone Age here makes it imperative to examine what key if any exists for linking up the South Indian evidence with the northern glacial data.

VI. THE AGE OF LATERITE IN CENTRAL AND SOUTH INDIA

The fact that laterite is preserved on the slopes of the Narbadā basin and not in the valley might indicate a period of erosion prior to the deposition of the basal zone. The contact between both formations is regarded as a major break comparable to the disconformity between the Older Upper Siwāliks (Lower Pleistocene) and the Boulder Conglomerate Stage (Mid-Pleistocene) in N.W. India. This relationship makes the laterite represent the Early Pleistocene.

A comparison of the N.W. climatic conditions during the Plio-Pleistocene times confirms the age-relationship between the Mid-Pleistocene Narbadā deposits and the underlying laterite. The main Plio-Pleistocene break in the Punjab indicated a change of climate there from tropical (Lower Siwālik) to temperate (the Early Pleistocene—Upper Siwālik). This, taken with the laterite below the disconformity under the Mid-Pleistocene Narbadā alluvium, argues a retreat of the tropical belt in the Early Pleistocene times southwards to Central India, if the equivalent of the Upper Siwālik Boulder Conglomerate of the Mid-Pleistocene should lie concealed in the enormously thick Mid-Pleistocene Narbadā, over 500 feet, of which the uppermost fraction of 130 feet has alone as yet been explored. Even in the Mid-Pleistocene the absence of any signs of lateritization of the Narbadā fossils and the lithic tools argues only subtropical conditions here and a further narrowing of the tropical belt to the south of Central India into the Peninsula and the forming of laterite in the Peninsula, of Mid-Pleistocene age. Although the age of the South Indian lateritic deposits with datable archaeological records has not yet been properly fixed, it is now known that lateritization has taken place in the implementiferous gravels near Madras. De Terra

observes that on the West Coast of India near Bombay he collected Early Palaeolithic tools with Abbevillian types in fluvial gravels which have undergone lateritization.[22] It is not improbable that Peninsular laterites, coastal (Bombay and Madras) and hinterland (in the Dekkan and Gujarāt), were formed at different times in the Pleistocene.

Three areas representing a cross-section of South India have also been studied in a few sites by Cammiade, Todd, Paterson, Drummond and the writer. Let us see how the Pleistocene archaeological data in Peninsular India compare with those obtained by the Yale-Cambridge expedition in the three main fields in the north, based on the Himalayan glacial cycle.

A. The inland region of the Dekkan

In 1930, Burkitt investigated a vast collection of Old Stone Age artifacts from Kurnool in the Dekkan plateau which L. A. Cammiade, an ardent investigator of prehistoric antiquities, had gathered in the Kistna basin at different levels from exposed sections in the neighbourhood of the Nandikanama Pass of the Nallamalai Range which arches parallel to the East Coast. Burkitt's interpretation of this collection has become classical for the early prehistory of India. It motivated, as already pointed out, the Yale-Cambridge expedition of 1935.

Mr. Burkitt classified the tools into four series [7] as belonging to distinct cultures of differing dates from Early Palaeolithic to Proto-Neolithic times, basing his results on stratigraphy, typology and *état physique* of the artifacts. The four cultures are:

(4) *Microlithic Industries.*—Outnumbering all other implements and made of agate and quartzite. This series includes crescents, triangles, scrapers and cores which are also met with at Polavaram on the Godāvarī river as well as Bāndā and in the Vindhyan hills. The finding of a small polished and shouldered celt of Burmese type near the Godāvarī river with this series will be of great interest if it is contemporary. This series recalls those of the Wilton Culture of South Africa.

(3) *Blade and Burin Industry.*—Slender and with blunted backs, with a few burins, planing tools and end-scrapers; closely allied to (4). Their material is lydianite.

(2) *Flake Industries.*—Mixed with neatly made handaxes and made of quartzite, sandstone and chalcedony. Less weathered than (1); found at the eastern and the western end of the Nandikanama Pass.

(1) *Earliest Biface Industries.*—Consisting of handaxes and cleavers of various types closely paralleled among similar finds in Africa. In the Bhavanasi at Giddalur, the Victoria West type of South Africa is a type tool; square-ended coupe-de-poing and cleavers recall those at S. Rhodesia and Tabelbala.

From the finds in 1936 by Drummond of a series of 'fairly Late Acheulean handaxes, cores and flakes, reminiscent of the Sohan industry at Giddalur in the same region, Paterson points out a probable contact here of the biface industry of the south with the Sohan flake industries of the north—a circumstance noticed in other terms by Burkitt when he separated the industries (1) and (2) of this region.

All these industries have exact counterparts in Africa.

Burkitt, in arguing a climatic cycle of pluvial and interpluvial phases in this region from the data supplied by Cammiade, points out that the cycle with its industrial horizons is paralleled in Kenya (Africa). One important observation made by him on the data before him, i.e. that the East Coast laterite, north of Madras, seems to be pre-human, is worthy of mention as it belongs to the general problem of the Pleistocene laterite formation in S. India.

The statement given below correlates the probable sequence of cultural and climatic changes of the Stone Age here in relation to the northern Pleistocene data obtained by De Terra.

Quaternary	*Deposits*	*Industries*	*Climate*
Post-Pleistocene.	Red clay overlain by red sand.	(3) and (4) cultures Microlithic and Late Sohan(?)	VI-VII *Dry Phase* followed by denudation leading to present conditions.
Upper Pleistocene.	River Deposits, Laterit-ization absent.	Flake Industry (2) Sohan.	*Humid Pluvial* V.
Mid-Pleistocene.	Gravels and clays.	Flakes Industry of (2) comes in, Handaxes survive.	*Dry Phase* IV.
	River gravels.	Handaxes of Period (1) comes to an end.	*Violent Pluvial* III.
	Open Plain.	Handaxe of Period (1).	*Dry Phase* II.
Early Pleistocene.	Laterite formation on East Coast.	Sterile.	*Long Pluvial* I.

The general similarity in the coherence of the seven climatic stages here postulated by Burkitt with the seven glacial stages discovered by De Terra for the north is worthy of note, as also the circumstance that the age of the laterite of the Narbadā Region (in C. India) is argued by De Terra, equally with Burkitt for Kurnool (S. India), to be of Early Pleistocene, sterile and pre-human.

B. The Gujarat region

In 1941-42 the Archaeological Survey of India sponsored an expedition[53a] into the Sābarmatī valley of Gujarāt for verifying the hiatus that Foote had from a section[35] of this river assumed to exist (from contemporaneous opinion in Europe) between the Palaeolithic and the Neolithic. The writer found the area to be a clear meeting-ground of the northern Sohan and the biface Madras Industry. The terraces, if any, in this region must be concealed under the thick loess that mantles it. But, as at Bombay and Madras, the pebble gravels here are lateritized and enclose abundant remains not only of handaxes but of pebble choppers of Early Sohan types (which in the south are far less dominant); they appear to correspond with Mid-Pleistocene Lower Narbadā Zone though the associated faunal remains are yet to be found.

The industry assumed by Foote to be Neolithic from scanty superficial associations with pottery and a few polished artifacts, would seem to be really Microlithic (Mesolithic?). It was found to be a dominant industry of the Gujarāt region going down into the lower levels of the *timbas* or loess mounds where it is without any neolithic association. This fact appears to be confirmed by Dr. Sankalia's further investigations[52] which seem to take this industry into remote antiquity.

C. The Coastal Plain of Madras

The Palar Plain round Madras, where the author commenced a Stone Age research in 1935,[41] is characterized by a spread of detrital laterite which is underlain at certain places by a Quaternary Boulder Conglomerate overlying Pre-Tertiary formations. On archaeo-geological grounds this can be correlated with the Mid-Pleistocene basal Narbadā Zone and with the Mid-Pleistocene sequence starting with the Boulder Conglomerate Zone of the Potwar. Paterson was the first to point out a fourfold Pleistocene terrace sequence in

Madras similar to that which his expedition had discovered in N.W. India. The laterite peneplain is cut by the prominent river (Kortalayar or Old Palar), and near the Red Hills at Erumaivettipalaiyam one can recognize the terrace features. Not far from this place to the north at Manjanakaranai in the same valley, Burkitt has interpreted the formation of laterite on archaeological data. The terrace-geology and the cultural sequence as worked out in Cambridge is as follows [26]:—

After deposition of the detrital laterite over a white boulder conglomerate (as at Vadamadurai), it was dissected, producing a set of three terraces 1, 2 and 3 at 60 feet, 20 feet and 8 feet above the present stream level in the Kortalayar valley. Terrace 1 appears to be erosional and little preserved and Terrace 2 aggradational in origin and well developed at Attirampakkam. No fauna was seen anywhere, but Old Palaeolithic industries are found in those terraces, and a short description of them is given below. The material used for the artifacts is in all cases quartzite found abundantly towards the west at Alicoor in the Jurassic Conglomerate and the Cuddappah series.[42]

Archaeology of the Kortalayar valley

The most important evidence for dating the Boulder Conglomerate is at Vadamadurai.[42] The lithic artifacts from this horizon are divisible into three groups,[26] based on patination and typology.

The Earliest Group: Non-laterized, with heavy cream-coloured (cortex) patination. The tools are rolled, of pre-lateritic age and contemporary with the Boulder Conglomerate. Further subdivisible on grounds of patination and typology into two sub-series:—

(1) *Early Series*:—Handaxes and cores with a heavy white (cortex) patination; Abbevillian type of handaxes crude and irregular with thick pebble butts and much cortex. Primary flaking denotes stone technique producing deep irregular flake scars with little or no retouch. Cores are very large and irregular and of no definite types. Flakes indicate primitive flaking with much cortex.

(2) *Late Series*:—Less patinated than the previous. Shows typologic advance, especially in cores. Handaxes resemble Early Acheul, regular in form. Though free flaking is common, step flaking begins. Cores are mostly discoidal with fairly regular alternate flaking. Flakes show absence of faceting of platform, less cortex, more primary flaking in upper surface than in the Early Series but still no retouch.

The Second Group: Stained red through contact with laterite gravel laid down on top of conglomerate. Definite typologic advance on the Earliest Group. Handaxes resemble Mid-Acheul types, flatter and neater, with more step flaking; pear-shaped and ovate forms being very common. Cores mainly discoidal in type as in the Late Series of the First Group, but with more regular flaking. Flakes show more primary flaking and none has a faceted platform.

Third Group: No laterite staining, a little patination. Handaxes made by wood-technique resemble Upper Acheul and comprise two types—ovates with flat step flaking, and a long and pointed type with thick pebble butt. Cleavers are very few in this group. In addition to the discoidal cores, there is a flat type of core with prepared platform for removing flakes from one surface. Flakes are thin but still show no signs of faceting on the platform, a few retouched as side-scrapers.

Attirampakkam Terrace

Next in importance to the Vadamadurai site is the terrace at Attirampakkam in the Kortalayar valley, where one sees the stratigraphic evolution of the Acheulean culture from the lateritic basal gravels of this terrace to the loam on the top in the exposed sections. The tools are prolific. While there is a small derived series (rolled) corresponding typologically

to the first two groups from Vadamadurai, the majority of the tools are fresh and contemporary with the basal lateritic gravels and of the same age as the latest series in Vadamadurai. The handaxes are reminiscent of *very* late Acheul types of Eur-Africa and even simulate Micoque forms, being thin, flat and elongated and made on flakes. Cleavers are abundant and of varied forms. Both show the Vaal technique of South Africa. Along with the dominant bifaces, there are cores and flakes exhibiting Sohan technique. The flakes from the loam are Levallois-like and show faceted platforms with much primary flaking on the upper surface.

In none of the sites so far explored in India are human remains representing the makers of the Palaeolithic culture known. But in this terrace Foote discovered a bone (now at Oxford) of a human skeleton seemingly washed out of the implementiferous conglomerate and associated with a large number of handaxes. This bone was examined by Profs. Busk and Dawkins and recognized as possibly a human tibia from which both the articulations were lost. It is probable that future explorers may be lucky enough to find here the representative of the race that made the great handaxe culture focussed in Madras.

Manajanakaranai Site

It may be pointed out here that Cammiade collected all the implements from the redeposited (detrital) laterite and not from the main laterite.[8] On typological analysis Burkitt puts the industry (consisting of bifaces, cores and flakes) as Late Acheul (fig. 7, 9) belonging to the end of Series (1) and the beginning of Series (2) in the Kurnool area, and therefore the age is at the very end of the Lower Palaeolithic and the commencement of the Mid-Palaeolithic. As, however, early Abbevillio-Acheulean tools, earlier than the Late Acheul, were found in the main laterite and stratigraphically earlier still in the Boulder Conglomerate at Vadamadurai, the age of the laterite round about Madras is, from archaeological similarities, assignable to the Potwar of Mid-Pleistocene period (Terraces 1 and 2); the Boulder Conglomerate of Potwar is further equatable to the Boulder Conglomerate Stage of Vadamadurai, with the main difference that, whereas the industry of the Boulder Conglomerate is a Pre-Sohan flake industry meagrely represented, in the South this stage belongs to a full-blooded, Abbevillio-Acheulean handaxe industry. Thus the age of the laterite on the East Coast falls within the human period at the end of Mid-Pleistocene, verifying De Terra's conception of a Mid-Pleistocene Age for South Indian laterite argued from climatic considerations.

In further support of the existence of Mid-Pleistocene implementiferous laterite on the East Coast, the Anthropology Department of the Calcutta University[55] discovered in 1940 a palaeolithic handaxe industry in the laterite (equally non-fossiliferous there as elsewhere) overlying unconformably a Mid-Miocene calcareous clay bed in the neighbourhood of Kuliana in the Mayūrbhanj State. This site seems to be as rich as Madras, with a fairly advanced Acheul industry mixed with a chopper-flake Sohan industry. Though undated, this laterite bed will fall within the Mid-Pleistocene on archaeological grounds, with a similar evolution to that in the Sohan area in the period of Terraces 1 and 2.

The Madras Industry

The handaxe tradition in the Lower Palaeolithic Complex is ubiquitous in South India. The localities around Madras are typical of this facies of the Abbevillio-Acheulean stages since the time of its first discovery by Bruce Foote as long ago as 1863; Oswald Menghin has applied for this the term Madras Industry as fairly typical of the rest of India from the remarkable uniformity in shape of the bifaces, ignoring the local variation inherent in such a vast land as India. It is high time that the term 'Madras Industry' was appropriated to

the *coup-de-poing* industry of South India, as Stellenbosch typifies that for South Africa. De Terra has already christened the North Indian flake-chopper facies of the Palaeolithic as Sohan and, for the sake of scientific brevity, the term 'Madras Industry' (figs. 7 and 8) will here be used to denote this biface industry (with its type fossil—the handaxe) in the Lower Palaeolithic Culture Complex of South India.

D. THE WEST COAST REGION

At Khandivli near Bombay an implement-bearing deposit, alike in age to the laterite of Madras, was discovered by Todd, in 1932.[57] He has observed definite signs of marine terracing round the 'flats' of Salsette at Borivli two miles north of Khandivli. The industrial sequence found in a section from the back of Padan Hill near Khandivli is as follows [58] :—

Resting on weathered basaltic surface is a LOWER CLAY which in turn is overlain by a reddish brown LOWER GRAVEL. This again is covered by a layer of MIDDLE CLAY succeeded by an UPPER GRAVEL and UPPER CLAY.

At the very base of the section in the LOWER CLAY rough tools and flakes comprising scrapers, cores and choppers recalling a Clacton (Early Sohan?) industry occur. There is evidence here of more than one period of flaking. Towards the top of this clay occurs a similar industry in 'mint' condition. A rostrate handaxe was recovered from this horizon. In the overlying reddish brown LOWER GRAVEL which is lateritized, are big boulders of basalt indicating strong pluvial conditions and lateritization. No fossils were found in this deposit. The artifacts here are in varying states of preservation made of chert and indurated shale and resemble Abbevillian and Clacton types. On the top of this gravel occur fresh Clacton implements as well as *Late* Acheul types of handaxes and cleavers paralleled by many examples from Madras, among them the Victoria West type being the most noticeable; Burkitt has also observed the prevalence of this type in Kurnool and Godāvarī (Choḍavaram). The flake-implements of this horizon are also Acheulean in technique by the mode of retouch, and exhibit similarities to the Tayacian of Prof. Dorothy Garrod in Palestine.

Over this comes a MIDDLE CLAY bluish and sterile, deposited under milder conditions. On the top of the MIDDLE CLAY is a blade industry (including cores, scrapers, and blades) mixed with small handaxes made on flakes. This would correspond to the flake-industries of Period 2 in the Kurnool region as classified by Burkitt.

From the UPPER GRAVELS a tooth of Equus was found which may be *Equus namadicus* of the Lower Narbadā. On the top of this gravel a *blade and burin industry* of indurated shale occurs which is further developed in the overlying UPPER CLAY. It includes polyhedral and angle burins as well as the parrot-beak type very reminiscent of the Asiatic Aurignacian of Europe and the Middle East. This industry corresponds to Series 3 of Burkitt's classification at Kurnool.

Finally a Microlithic industry appears on the surface in the coastal areas as elsewhere in South India. The results of this discovery on the West Coast shows lateritization in the Mid-Pleistocene gravels containing a Madras Industry with an admixture of Sohan in the earlier stages which branch off into a different Aurignacian facies culminating in the later stages in a Microlithic phase. This again confirms De Terra's observation of a Mid-Pleistocene lateritic formation on the West Coast during the Palaeolithic period. This formation also occurs over the Warkalai formation of the West Coast from Ratnagiri to Malābār. Palaeolithic implements have not been recorded from the Malābār Coast in the laterite, doubtless owing to paucity of research. But the presence of Quaternary terraces in the South Kanārā District, as observed by the author, makes the region all the more interesting for the Stone Age.

VII. THE PROTO-NEOLITHIC COMPLEX

A. Mesolithic in India

The Mesolithic and Neolithic ages in India have not been so well studied as the Palaeolithic, and considerable divergence of opinion therefore exists in respect of the field evidence. Bruce Foote classed the Microlithic phase with the Neolithic on the strength of the industrial kinship of pottery occurring in both, while De Terra sees in the Microlithic the dawn of a new lithic era distinct from the Palaeolithic and would class it as 'Proto-neolithic'.[26] In this he is in agreement with other notable workers in this field like Todd,[57] Gordon,[38] Cammiade[9] and Noone.

Microlithic industries have been found all over India, as shown by the distribution map, from the N.W. Frontier to the tip of the Peninsula and from Sind in the west to Orissa on the East Coast, and it is unlikely that they all represent a single wave. In their typology they exhibit a striking similarity with the Western Capsian (Mesolithic) culture. That this similarity may also be genetic is suggested by the fact that recently Dr. Iravati Karve[53], studying human skeletal remains from the Microlithic levels of Gujarāt, finds in them Hamitic-Negroid characteristics and even a kinship to north-east Africans and perhaps to Proto-Egyptians.

The 'Hiatus' problem

Foote, as already stated, takes a section of the Sābarmatī river as supporting the then current theory of a 'hiatus' between the Palaeolithic and Neolithic Ages. This is not tenable, as in my exploration of the loess mounds of Gujarāt any association of pottery and Neolithic objects with Microliths was seen only near the surface and not below. This is confirmed by the observation of Dr. Sankalia. Burkitt and Todd have in Kurnool and Bombay been unable to find any hiatus in the sequence from the Palaeolithic to the Neolithic. Again from the survival in Potwar and Kashmir of the Sohan tradition of flaking in association with pottery and Neoliths in the Post-glacial loess (Terrace 5), and from the find of Microliths in the Potwar loess surfaces (Terrace 4), De Terra, assigning the latter to a fossil-soil of sub-recent origin, argues that the Post-glacial silt ought to reveal the transition from the Palaeolithic to the Neolithic. Possibly a phase of this tradition is also Microlithic. That a high antiquity may pertain to Microliths is shown by the discovery by Foote[35] of Microliths embedded in the red fossil dunes known as Teris in the tip of the Peninsula.[2] Therefore, until the 80 feet loess in the Sābarmatī Section of Foote (which has as yet remained uninvestigated) has been studied for the course of evolution that it can show from the Upper Palaeolithic into the Microlithic, no certain hiatus can be affirmed.

Stratigraphic evidence

Roppa Culture. Recently a real Mesolithic culture was affirmed by Dr. M. H. Krishna[40] at the site in Brahmagiri in the Chitaldrug District of Mysore. Subsequent excavation here, however, has shown that this so-called Roppa culture was associated with Neoliths ; and further enquiry is likewise desirable into an alleged pre-Neolithic Microlith-industry at the site of Māski in the Nizam's Dominions. In the Narbadā region, De Terra records a Microlithic industry representing a Proto-Neolithic phase found in association with the third cycle of sedimentation in the Narbadā, namely the 'Cotton Soil'. This industry (in semi-precious stones) starts in the basal gravel of the Cotton Soil cycle and evolves also into the top-clay, and it is homologous with the Mesolithic culture, as noticed by Burkitt too for Kurnool.

Surface evidence

The surface evidence from various regions has also received attention at the hands of Cammiade, Todd and Gordon.

(*a*) In Kurnool, as observed by Cammiade, the latest is a prolific Microlithic industry and recalls the pygmy finds from Bāndā and the Vindhyan hills in Central India. A similar Microlithic industry has been found in the Lower Godāvarī in association with a small polished shouldered celt of the Burmese type[7] at one site, and with coarse hand-made pottery from some other sites, and even with proto-historic funeral urns[9] in some others. This can show at the most only a survival of the Microlithic industry through Neolithic down to proto-historic times.

(*b*) Gordon, working in central India, concludes that the rock-shelters containing paintings[37] show an extension into them of a Microlithic culture as found elsewhere in India and displaying a wide range of types including crescents, triangles, trapezes, straight blades, and cores. As he could not date the paintings earlier than 500 B.C. this evidence might possibly indicate a survival of the Microlithic down to historic times.

(*c*) The evidence from western India round Bombay has been set forth in 1939 by Lt. Todd.[58] In a section at Khandivli there is a deposit of 18 inches of brown clay (which he calls *Upper Clay*) over an *Upper Gravel*. At the junction of these is a blade and burin industry which appears to get into a more evolved stage in the *Upper Clay* with such types as polyhedral and angle burins and even the parrot-beak type. Finally towards the top three inches a Microlithic industry appears similar to those found on the surface at all the coastal sites. The evolution here disclosed has the same order that Burkitt has noticed at Kurnool in the relationship of the Kurnool industries 3 and 4.

These coastal Microliths from their form, patination and state of preservation seem to Todd definitely of earlier date than the pygmies from the inland sites at Jubbulpore and the Vindhya hills, and comprise many forms not there recorded; the inland groups seem to consist of lunates, blades and cores only. In the coastal site at Marve three miles west of Khandivli a Microlithic industry is noticed similar to that at Khandivli but associated with sherds of pottery-bowls of the round-bottomed types common to the Neolithic sites. A phase of this coastal Microlithic culture, occurring in rock-shelters round Bombay, he finds to be contemporary with the prehistoric engravings in them and of pre-Buddhistic date, i.e. earlier than 200 B.C. It appears that he also found a few micros of bottle glass[57] in the culture area of the Bhils and the Bushmen of Bombay.

The evidence of western India accords with that of Gordon for central India as pointing to the existence of the Microlithic stage from Neolithic times to pre-Buddhistic and perhaps even to historic times.

The evidence as a whole, stratigraphical and surface, would seem to make out the Microlithic industry in India—

(1) as of equal antiquity with the western Mesolithic culture and very probably derived from it, in as much as the Mesolithic has not yet been found in Burma in spite of extensive exploration by Dr. Movius,[28] and

(2) to occupy in India, as in Europe, an intermediate position between the Palaeolithic and the Neolithic, though also surviving with the later cultures.

B. Proto-neolithic in Sind

Quite different from the Microlithic facies is a Proto-neolithic flint industry brought to light in the Lower Indus at Sukkur and Rohri by Evans in 1866. It was studied by Drummond and Paterson, and though there was no stratigraphic evidence, they were in

1937 able to announce it on a typological analysis to be not Palaeolithic[22] but Proto-neolithic.[26] It is characterized by thin long blades and slender conical cores reminiscent of the stone industry of Mohenjo-daro, and was probably an indigenous culture leading to the Indus Valley Civilization. Though Sukkur and Rohri are situated in the same limestone belt and in close proximity, the Rohri industry belongs only to the latest phase of Sukkur.

The entire industry consists of blades, flakes and conical cores, and an analysis on the basis of patination divides them at Sukkur into three categories, A, B and C; blades predominating in the earliest A and gradually dwindling in the latest C. The flakes are throughout concavo-convex though they present an evolution from A to C along with the cores. In B the presence of a Levallois technique of primary flaking and large ovate handaxes make them deceptively Palaeolithic in appearance. Group C lines up with the Rohri industry and shows marked similarities with the earliest Mohenjo-daro.

A replica of this industry both in flint and trap occurs as far away in the south as Raichūr in the Nizam's Dominions where Khwaja Ahmed says that the Sind type of flint is available. How to relate these two far-off industries is a puzzling question.

Paterson assigns a very late date to these industries from the following features: (1) a strange combination of various techniques exhibited by the types never found in the Palaeolithic Age, and (2) the evolutionary link apparent between the Rohri stage and the indigenous stone industry at Mohenjo-daro.

C. Proto-neolithic in N.W. India

At Pampur, 7 miles S.E. of Srinagar, and again at Sombur,[26] 4 miles south of Pampur, De Terra found remains of a late Palaeolithic Sohan industry (in Sombur in association with pottery). They had in 1932 been considered by Chr. and J. Hawkes as Mid-Palaeolithic, but De Terra showed in 1935 that they belong to the (Post-Palaeolithic) fifth terrace of the Jhelum and were therefore Proto-neolithic, and that the flake industry is only a survival of the Palaeolithic Sohan tradition. At Pampur the fifth terrace consists of a brown loamy silt above the Upper Karewa Lake clays and (with a disconformity between) below a loessic silt of the first millennium A.D. The unconformity shows the culture in the buried fifth terrace as of great antiquity.

South of Rawalpindi (at Chittā) in the central Salt Range in and near Uchali, implementiferous layers and human burials of *Homo sapiens* of long-headed type respectively are found in association with hand-made pottery in the Post-glacial loessic soil overlying the Potwar silt. The lithic industry being reminiscent of a Late Sohan and the pottery pointing to the Neolithic, the industry of the loessic soil has been ascribed to a transitional Proto-neolithic stage.

VIII. THE NEOLITHIC AGE

Early collections

All over India, ground and polished stone implements of the 'New Stone Age' have been found, their characteristic material being trap in the place of the quartzite used in the Old Stone Age. In typology it is entirely different from the Palaeolithic and of very varied forms involving new techniques. The earliest archaeo-lithic finds in India were in the valley of the Tons river in the United Provinces by Le Mesurier in 1860 (three years before Foote made his Palaeolithic discoveries), and they were polished celts of this Age. In 1872 William Fraser located Bellary as the real focus of the Neolithic culture in South India—indeed it has been claimed to be 'the richest region in prehistoric remains in the whole of the Indian Empire'.[4] Here Foote followed soon[35] and made a vast collection of

Neoliths now lying in the Madras Museum by the side of other similar collections made by him in the neighbouring districts. Similar collections from the rest of India are in the Indian Museum at Calcutta and to a small extent in other Museums.[4]

AN UNTRODDEN FIELD

None of these collections have been accompanied by reliable field data and the various stages by which the Proto-neolithic advanced into the Neolithic and thereafter merged into the Copper Age in the North and the Iron Age in the South have as yet remained entirely uninvestigated. What is immediately possible, therefore, is only to form a vague picture by piecing together the available meagre data.

It was only in 1936 that Paterson studying Foote's collection of Bellary (surface) Neoliths was able to assign (what had never before been done) an enormous antiquity to them. On the basis of the orange patination of the trap tools he divides the Neoliths into several stages (corroborated by their typology)—the earliest showing a similarity with the Proto-neolithic phase at Sukkur and Rohri. This is reinforced by the museum collections at Hyderabad (north of Bellary) which I had occasion recently to inspect by courtesy of its curator.

STRATIGRAPHIC EVIDENCE FROM MYSORE

This high antiquity for the Bellary Neoliths postulated by Paterson has received confirmation from excavations made by Krishna at Chandravalli and Brahmagiri in the Chitaldrug District of Mysore. At Chandravalli below the thin Sātavāhana layer there was found a Mauryan layer passing down into a prehistoric Iron Age stratum of undated origin. Below this, at a depth of 12 feet from the surface, a Neolithic stage was met with. This evidence has been supplemented at Brahmagiri[40] where with a full-blooded Neolithic, passing down into a weaker phase of the same, a crude Microlithic industry associated with hand-made pottery appeared. This Neolithic stratum is capped by a prehistoric Iron Age layer styled by him the Isila culture and characterized by black polished pottery into which the Neolithic shows an evolution visible in red and black pottery types. This evidence was thought to take the Neolithic beyond 2000 B.C. The trend of this evidence is expected by Krishna to be confirmed at Māski in the Hyderabad Dominions, where a similar set of industries appears to have come out in excavation.

STRATIGRAPHIC EVIDENCE FROM NORTH INDIA

The Neolithic discoveries made here by the Yale-Cambridge expedition carry the Neolithic to a far greater antiquity. In the menhir-site at Burzhom[26], between Srinagar and Gandarbal, the loess soil in Terrace 5 revealed waste flakes and cores (reminiscent of a late Sohan technique) in association with pottery, besides hoes, pestles and polished celts of trap found at depths ranging from 2 to 10 feet. Excavations up to 12 feet reaching virgin soil disclosed three cultural layers A, B and C. A and B, together making up 3 feet of weathered loess, contain (A) a Buddhist layer of the fourth century A.D., and (B) a highly polished black ware and potsherds with incised geometric designs recalling a late phase of the Mohenjo-daro culture, best represented at Jhāngar in Sind.

Below this is the unweathered post-glacial loess (C), 9 feet in depth, and even at the bottom of it a Neolithic hearth was found along with polished celts, bone awls and culinary pots. Though no definite range of time can be assigned to this aeolian deposit, its depth appears to take the antiquity of the Neolithic in India far beyond that of the Mesopotamian which has been assigned to 6000 B.C. to 4000 B.C.

A similar Neolithic industry was found by Paterson going to a depth of 7 feet in the post-glacial loess of the same terrace at Nunar, not far from Gandarbal. All this appears to indicate that the Neolithic here found was contemporaneous with the enormous range of time indicated by this post-glacial formation.

IX. SUMMARY

From the preceding regional study of Quaternary data in India the Stone Age complex can be resolved into datable industries on the scheme based on the Himalayan Ice Age Cycle and a study of the terrace geology in the Upper Siwāliks of the Potwar area in the Punjab. So far no sure human tools have appeared in the Early Pleistocene beds. The earliest Palaeolithic industry in N.W. India is represented by a PRE-SOHAN flake industry which recalls the Cromerian, i.e. a Clactonish tradition of the Early Palaeolithic in East Anglia. This begins in the topmost Upper Siwālik Gravels, viz. the Boulder Conglomerate at the close of the second glaciation in the Mid-Pleistocene stage.

From now on the industries are limited to certain stratigraphical horizons that coincide largely with the Middle and Upper Pleistocene terraces. From the first terrace along the Indus and the Sohan and also from the Basal Narbadā Group of Central India and generally from the basal gravels all over South India, are found two different manufacturing traditions working together and of equal antiquity. These date from the long second inter-glacial or inter-pluvial. One of them, the Sohan industry with its primary focus in the north, produced pebble choppers and flakes and cores of Clacto-Levalloisean types, and evolved on its own lines. The other tradition is the Core-tool or the handaxe tradition with its primary focus in the Peninsular portion, especially round Madras, and is related to the European or African *coup-de-poing* industries. Stratigraphically the Early Palaeolithic of India (the Early Sohan and the Madras Industries) showed its greatest development during the second inter-glacial and third glacial terraces (Terraces 1 and 2). The Late Palaeolithic largely falls into the last glaciation and in Terraces 3 and 4. It is a dominant flake-industry of a full-blooded Levallois in the Punjab, and this similarity in evolution is also a feature of the Narbadā and the Peninsular areas.

A true Upper Palaeolithic such as Solutrean and Magdalenian is unknown in India. Instead there appears a blade industry here, very reminiscent of the Asiatic Aurignacian of Europe, as pointed out by Drummond. [29] This is confirmed by the find of a working floor of a blade and burin industry on the surface of the Upper Gravel at Bombay by Todd, and by Burkitt when he separates this industry as the third series among the industries of the Kurnool region in the Dekkan. The most recent industry is an extensive Microlithic industry appearing in the Second Loess of the Punjab, in the *regur* of Central India and in the Loess of Gujarāt and in the fossil dunes of the coastal region of South India. There seems to be a typological relationship between this industry and the (Mesolithic) Capsian of Syria and Africa. Finally, the Microlithic phase of the Stone Age merges with the typical Neolithic phase all over India.

The diffusion of the Neolithic in India may be conjectured to have been from north to south as the (oldest) Microlithic phase of the Proto-neolithic is quite rare north of the Vindhyas and the Proto-neolithic phases proper (developing into the Neolithic) are all confined to northern and western India.

X. TYPOLOGICAL PARALLELISMS IN INDIA AND ABROAD

Burkitt in his analysis of the lithic industries of the Kistna basin observes that all the four industries are stratigraphically distinct entities and have exact counterparts in Africa

from the Stellenbosch to the Wilton. The handaxe and the flake industries of South India have their counterparts in the Victoria West, Stellenbosch and Fauresmith industries, and Prof. Van Riet Lowe has drawn attention to the possibility of a common origin of the quartzite cultures of Madras and those of South Africa. Both in India and Africa the various stages of the handaxe culture are typical of the Mid-Pleistocene period. The Nanyukian and Fauresmith cultures, which show the contact of the core with the flake industries, have their counterpart also in South India, and in the Attirampakkam terrace in Madras they are admirably indicated. In Africa, the Upper Stellenbosch culture exhibits certain types, viz. the core of the Victoria West type of handaxes and those made by the Vaal technique giving rise to single and double variants. In Madras, the Dekkan and Bombay all these types occur and are associated with the Late Acheul types. As in Africa and Europe, the Abbevillian stages do not include cleavers, but in the Acheul stage cleavers of distinct type are common. Even the S-twist in the handaxe and the ovates as seen in the Mid-Acheul of Africa and Europe occur in the corresponding stage in South India. Todd brings out a similar impact of the flake-core industries at Bombay. He finds implements of Clacton type in 'mint' condition with Late Acheul types, and also a Victoria West type paralleled by many examples from Madras. The flake-implements found at the top of the reddish brown gravel in the Khandivli sequence are, he points out, of Acheulean facies, comparable to similar Tayacian finds made by Prof. Dorothy Garrod in Palestine.

The 'Chopper-chopping (pebble) complex' in Early Sohan occurs in India in association with the Madras Industry, in the North in relative dominance and in South and Central India in relative scarcity. There has as yet been found no Pre-Stellenbosch in the South, while in the North the Pre-Sohan is only a flake industry and nothing comparable to this has been found anywhere in Asia. Therefore the Pre-Stellenbosch pebble industry of Africa, though showing a dispersal there as the Kafuan and the Oldowan industries in the Lower Mid-Pleistocene, is not, so far as one can see, migrationally relatable to the Indian pebble complex, which occurs only as a phase of the Early Sohan and of a definitely later age, viz. the Madras (Stellenbosch) Industry. Whatever the connection between the Abbevillio-Acheulean industries of Africa and India, the origin of the pebble complex is non-African and may be, as Dr. Movius suggests with reference to the general 'Chopper-chopping complex' of Burma and the Far East, within the Sohan itself.

As one proceeds westward to Europe, the Clacto-Levalloisean flakes and the Abbevillio-Acheul bifaces become evolved and differentiated into separate industries but eastward they become promiscuous and hard to be recognized as separate, their only affinity with the west being the general similarities of technique and their relative sequence. These similarities in the Lower Palaeolithic times between the two wide-apart regions of Africa and South India are however so marked as to point to a close migrational connection between the two areas.

In the Late Palaeolithic times even the blade and Microlithic industries are closely allied to the Wilton culture of South Africa as found in Kenya and Uganda. As pointed out by Drummond the Upper Palaeolithic in North and South India is, in its final phases, very reminiscent of the Asiatic Aurignacian of Europe and Asia. This appears to be corroborated at Bombay too by Todd and by Burkitt's analysis at Kurnool. It thus looks as though the focus of this culture was in the neighbourhood of Palestine as suggested by Prof. Garrod.

Then again the wide spread of Microliths all over India links up with the western Mesolithic Capsian culture of Africa and Syria. This westward genetic relationship of the Indian Microlithic phase is further supported by the recent work of De Terra and Movius in Burma, where there is a complete absence of Mesolithic culture although the cave-region

of the Southern Shan States was extensively explored, and by the new field evidence from skeleton remains furnished by Dr. Iravati from the microlithic levels in Gujarāt.

Lastly, the work in Java under Dr. Koenigswald and in Burma by De Terra and Movius adds to our ideas concerning the spread of the Indian Stone Age Culture. There is a handaxe industry in Java (Patjitan) but it occurs as a special facies [24] only and any resemblance in it to the Madras (Handaxe) Industry might possibly be but of a convergent character; it is altogether absent in Burma and even in Malaya, so as to exclude any genetic migrational connection with South India. The Anyathian (Burmese) 'Chopper-chopping' tool complex is identical with Java. It exhibits some resemblance to the 'Chopper-chopping' tool complex of the Sohan culture of North India. But the Sohan tools include finely made core implements with alternate cutting edge, while in the Burmese-Java phase the tools are extremely coarse and devoid of the Clacto-Levalloisean influence that characterizes the Sohan.[28] The Sohan has therefore very probably to be assigned a western Asiatic genesis and not an eastern one from the Anyathian and Far East. But a very significant fact in the diffusion of these cultures is the prehistoric vacuum north and east of the Ganges that Movius and Worman point out on their distribution map. Here neither Sohan nor the Madras Industries have been heard of and future research alone can decide finally on the origins of the Sohan and the Anyathian.

XI. THE FUTURE OF INDIAN STONE AGE RESEARCH

After seventy years of mere collection (unrelated to the requisite field evidence) which, if made solely for exhibition in museums, brought out the richness of the field in India, Indian prehistory has had, in the last decade and a half, opened up for it a vast horizon, through (as has been done for the European Stone Age) the dating of artifacts in a reliable geological framework. This has been discovered for India by Burkitt, De Terra and Paterson, and is indicative of climatic fluctuations. The Yale-Cambridge Expedition put the pre-existing North Indian collections in their real geological context. In South India the vast and valuable collections of Foote in the Madras Museum remain as yet wholly uncorrelated to the Quaternary sequence, and, what is more prejudicial to the scientific work ahead, is the persistence even now of the uninformed collecting spirit.

Even the experts whom I have mentioned have but secured glimpses of the Stone Age from selected spots widely apart and, pointing out the many problems in India that await solution in all the three stages of the Stone Age, they have been the first to urge the exhaustive regional studies required to put their Quaternary data on a solid foundation. The first need therefore is for regional surveys of river valleys, the potentialities of which have already been sufficiently indicated by Foote and others.[1]

Immediately following each such survey, the industries of each region have to be closely studied *per se*, to bring out the sequence of cultures and the techniques involved in them. This, above all, will enable regional comparisons to be made and diffusion of cultures traced. There are at present two sequences to go by, one for Kurnool by Burkitt, and the other for Potwar by De Terra, and both of these have to be corroborated through regional studies. There is at present great uncertainty as to the influence of the Sohan (Clacto-Levalloisean facies) towards the South. In South India (and, as pointed by Lowe, in Africa also) [59,60] the flake industry appears to have existed as an integral part of the handaxe culture, instead of (as in Europe) in mutual exclusion; but there is a doubt as to whether the flake industry was autochthonous or really represents a Sohan influence implying ethnic differences. Again the pebble facies of the Sohan, which is absent in South India, has been observed by the author in Gujarāt side by side with the *coup-de-poing*, a circumstance that suggests the enquiry, whether Gujarāt was the meeting ground of the Sohan and the Madras Industries.

In the North the Sohan flaking tradition is observed to have survived into the Neolithic, but in the South the evolution of the Palaeolithic into the Neolithic is yet to be understood. Prehistoric no-man's lands, calling for immediate investigation, exist as far apart as the Malābār coast and the Himalayan terrain east and north of the Ganges. That the former tract is not the vacuum it is usually thought to be is proved by Todd's discovery of Microliths at Calicut and by the author's recent discovery of a Microlithic site in Cochin State; while the latter is the spot where has to be sought the answer to the great question of the relationship between the Sohan of India and Anyathian of Burma. Before wider correlations can with any profit be indulged in, the initiation of intensive regional surveys is evidently a *sine qua non.*

Now that the Indian Stone Age sequence seems to be quite different from the European pattern of De Mortillet, its study (still in its infancy) necessarily brings with it a caution against importing, through the European terminology employed, implied assumptions also of cultural affinities while describing mere technological similarities. Generic names such as Core, Flake, Blade have the same meaning everywhere and are therefore of universal application. In North India the term Sohan has dispensed with all difficulties of nomenclature, being a new Palaeolithic discovery, which Movius is inclined to think is akin to the oriental scheme presented by the Far East rather than to the occidental European scheme. South India, however, presents remarkable typological parallels to Europe without similar cultural affinities. In such circumstances the Abbevillio-Acheulean nomenclature can scarcely be excluded, but it has also to be made innocuous by the prefix 'Madras' to denote the Indian facies, as, in Rhodesia, the term used is African-Abbevillian. Similarly, if the Microlithic Tardenoisean is found in India, the affix 'Tardenoisean' has necessarily to be dropped in the Dekkan for the reason that, as Burkitt points out, the essential type-tool (the micro-burin) of the Tardenoisean is absent in India, and the industry has therefore to be described as 'Kurnool', as the term 'Wilton' has been used for Africa, or, if the Wilton of South Africa is congruous with the Dekkan, the term 'Kurnool-Wilton' may be used.

Germane to all the above is a primary problem set by De Terra for both the Pleistocene geologist and the prehistorian as providing a test for all his results, the solution of which is calculated to link with the Himalayan glacial cycle the contemporary pluvial cycles of the (tropical) Peninsula, so as to knit the pan-Indian Stone Age into one scheme. This means the investigation, for its Pleistocene laterite formations, of the Singrauli basin (with, as in Madras, its Mid-Pleistocene implementiferous gravels) situated on the verge of the Peninsular land mass between the glaciated highland and the tropical belt. De Terra had seen signs on the Narbadā of a meeting of two cultures, the Sohan and the Madras, and the Singrauli basin seems to him a region likely to reveal this culture contact.

Faunal remains, as an aid in evaluating the number of pluvials, being scarce in the Pleistocene terrace gravels of South India, some other means has to be found for supplementing this deficiency. Here, as Dr. Wheeler has pointed out,[62] a new technique can come to our aid, one developed and tested by Zeuner for the mechanical analyses of river gravels. By this it is possible to ascertain the agency (wind or water) and the climatic conditions of the deposition of the soils, contemporary to fossil human industries enclosed in them.

Lastly, a completely neglected field in India is that of the Pleistocene deposits in caves and rock shelters. In only one cave known to the prehistoric archaeologist for over a century, i.e. at Kurnool, Foote found in 1884 fossil bones of extinct mammalia of the Narbadā type intermixed with Magdalenian bone implements. The bone implements have never been described and they have been lost. Recently a huge rock shelter was visited by the author at Alicoor near Madras and found to be of great promise, especially for the Palaeolithic stages. Investigation here is almost bound to throw light on the evolution of the Old Stone Age industries obtained in the open gravel sites in the vicinity. Though

no index of Indian prehistoric caves exists, this has recently been attempted though not yet published by Brig. E. A. Glennie, of the Survey of India, on behalf of the British Speleological Society.*

On the whole there is every justification for the Indian prehistorian to join with Prof. Boswell in feeling that 'we seem at the present time to be living in the golden age of research in Prehistory'.

XII. ACKNOWLEDGMENTS

In submitting this composite story of Early Man in summary from diverse sources, I am inevitably under great obligations to many previous writers whose publications I have consulted and mentioned in the bibliography.

As an associate of the Yale-Cambridge Expedition of 1935, I am especially indebted to Drs. De Terra and T. T. Paterson for having introduced me to their methods of work in Pleistocene geology as applied to the Indian Stone Age. Through these experts I had the good fortune of becoming a student of Mr. M. C. Burkitt and M. l'Abbé H. Breuil, the doyens of European Prehistoric Archaeology. The latest memoir on 'Early Man and Pleistocene Stratigraphy in Southern and Eastern Asia' by Dr. H. L. Movius, Jr., has given us a new oriental perspective into which the European scheme of De Mortillet does not well fit. To these savants, who have shaped my insight into Indian Prehistory, I express my deepest debt of gratitude and dedicate this paper jointly to them.

I am particularly beholden to:

the Carnegie Institution of Washington in my reproduction of Plates XX, fig. 1 and Plates XXXIII to XLIV from the *Studies on the Ice Age in India and Associated Human Cultures* by H. De Terra and T. T. Paterson,

the Editor, *Geological Magazine*, in reproducing figs. 5 and 7 in the article on 'Climatic changes in South-East India during Early Palaeolithic Times' by F. J. Richards, L. A. Cammiade and M. C. Burkitt,

the Editor, *Antiquity*, in reproducing fig. 2 from the article on 'Fresh Light on the Stone Ages in South-east India' by M. C. Burkitt and L. A. Cammiade, and

the Secretary, Royal Anthropological Institute, in reproducing figs. 6, 7 and 8 from the article on 'Palaeolithic Industries of Bombay' by K. R. U. Todd.

Without such suitable illustrations to elucidate and enliven the text, it would be hard to make these 'sermons in stones' intelligible.

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APPENDIX

GLOSSARY OF SOME TECHNICAL TERMS

Abbevillian: The oldest industry of the Palaeolithic, named after Abbeville on the Somme in N. France where it was first discovered. It is characterized by crude massive handaxes made by being struck with a stone hammer or on a stone anvil. This term has superseded the term Chellean, an industry mistakenly considered for some time as the oldest. The technique involved here is called 'Clacton'.

Acheulian: The second stage of the Lower Palaeolithic. St. Acheul near Amiens on the Somme first disclosed this industry. It is characterized by *coups-de-poing* and cleavers evidently evolved from the Abbevillian stage. They show a controlled flaking possible only with a wooden and not a stone hammer. In addition to the 'Clacton' technique another technique known as 'Levallois' also appears.

Aggradation: The formation of river deposits during floods resulting in a terrace, a normal habitat of Stone Age Man.

Aurignacian: The lowest stage of the Upper Palaeolithic, named after a small rock-shelter in the Pyrenees District. Essentially a blade and burin culture.

Biface: Used for Abbevillian and Acheulean *coups-de-poing* or handaxes as they are chipped on both faces.

Blade: A long narrow flake struck off a core with nearly parallel sides, thin and flat as compared with its length. It may have a plain or faceted striking-platform.

Boulder Clay: An ill-assorted accumulation of fine clay, scratched rocks and erratic boulders deposited by a glacier; also known as a moraine.

Burin: A French term for a graving tool formed by a blow struck at the working point along the length of the blade or flake. The resulting flake-scar is known as the burin facet. This is a type-tool of the Upper Palaeolithic and Mesolithic of Europe.

Cainozoic (Cenozoic): Relates to the most recent geological era of 'modern' life, commonly divided into two principal parts, the Tertiary and the Quaternary.

Celt: So called from the Latin 'celtis' or 'celtes', a chisel. Also known as adze or axe. A type-tool of the Neolithic period made of trap or other rock by the combined techniques of chipping, grinding and polishing. The basal type has a sharp convex cutting edge, the butt end being pointed. The sides are straight and converge towards the butt. The section in the middle is oval.

Chopper: A term used for a scraper of massive size flaked by secondary working on the upper surface. This is also a core tool.

Clacton technique: Named after Clacton-on-sea near the Thames estuary where it was first recognized. A method of flaking a lump or core of stone by striking it on a fixed stone anvil or with a stone hammer. The flakes have a simple striking-platform without any signs of preparation. The flaking angle is very wide, usually 120 degrees between the striking-platform and the primary flake-surface.

Cleaver: Is a *coup-de-poing* ending in a wide chisel-edge formed by the intersection of two large flake scars inclined to one another at an acute angle. This tool along with the handaxe is characteristic of the Acheulian stage of the Lower Palaeolithic.

Core: The portion of a lump of rock from which flakes have been removed is termed a core. The concave depressions on the core left by the removal of flakes are known as 'negative flake scars'.

Coup-de-poing: Almond or pear-shaped stone tool trimmed by flaking on both faces, hence a core-tool. But occasionally a flake is also modified into a handaxe. Same as handaxe, boucher or biface.

Degradation: Formation of a terrace by erosion due to glacial or river action. A terrace of degradation (of erosion) is distinguished from a terrace of aggradation (of deposition) by the absence or presence of gravel deposits.

Diastrophism: Means movement of the earth's crust resulting sometimes in the warping of sedimentary deposits.

Disconformity: An arrangement of layers of sedimentary rocks in which one group rests on the worn surface of an earlier series denoting discontinuity and interruption in deposition.

Flake: A chip struck off a lump of rock by 'Clacton' or 'Levallois' techniques.

Handaxe: Same as *coup-de-poing*. Also known as boucher or biface.

Holocene: The last geological time division, known also as 'Recent', the one we are passing through, following the Pleistocene. It is coeval with the Post-glacial stage. It is characterized by the first appearance of domesticated cattle, sheep and dog.

Ice Age: Co-terminous with the Pleistocene, when arctic conditions prevailed even in lower latitudes. It was not one continuous Ice Age but represents four glacial stages separated by warm periods known as interglacial stages, as revealed in the Alpine region where the glacial stages have been styled respectively Günz, Mindel, Riss and Würm after four little rivers of that region flowing into the Danube. The interglacials are accordingly styled Günz-Mindel, etc. These seven stages of the Ice Age provide a reliable chronological sequence for dating Stone Age industries.

Isila Culture: Named after the Mauryan town of Isila, used by Dr. M. H. Krishna in Mysore for the prehistoric Iron Age culture of the Deccan beneath a Mauryan layer at a site in Brahmagiri (Chitaldrug Dist.) recently excavated by him.

Karewas: Kashmiri name for the huge Pleistocene sedimentary deposits surviving as flat terraces along the Jhelum valley in Kashmir above its modern alluvium. They have been held to be the remnants of a lake which once filled the valley basin for nearly 2,000 square miles from Shupiyan to Baramulla.

Levallois Technique: This process is applied to a stone by first trimming it to form a core called a 'tortoise core'. A striking platform is prepared by removing small flakes at right-angles to the flat upper surface. The core is now struck on the prepared striking platform to detach a large flake. The upper side of this flake shows convergent flaking, while its underside is a primary flake surface. The name Levallois is derived from a suburb of Paris where certain flakes made by this technique were first recognized.

Loess (*Löss*): Fine wind-borne material, unstratified and deposited in periglacial tracts without any relation to physiographic barriers, as in the Potwar region of North-West India and in Gujarāt; usually calcareous and characterized by vertical cleavage.

Madras Industry: This name is given to the great Handaxe Culture characteristic of South India; it was around Madras, the type-locality of this culture, that Bruce Foote discovered the first handaxe of the Lower Palaeolithic. Hence Madras Industry means the *coup-de-poing* industry of South India, as Stellenbosch typifies that for South Africa.

Mesolithic: Middle Stone Age, bridging the Palaeolithic and the Neolithic. It is characterized by tiny stone tools known as microliths or pygmy implements.

Micoquian: Named after the little cave of La Micoque near Les Eyzies in central France where the industry was first recognized. It is the final phase of the Acheulian resulting from the fusion of core-flake industries and characterized by the highly evolved lanceolate type of handaxe.

Microliths: Tiny flake-tools characteristic of the Mesolithic period. They are shaped in geometric forms like crescents, trapeze, and triangles and in non-geometric shapes such as blades, cores, etc. These are characteristic of the Capsian or Tardenoisean cultures of the Early Mesolithic.

Moraine: A glacial deposit, same as Boulder Clay and styled End, Medial or Lateral according to its position relative to the glacier.

Neolithic: Or New Stone Age distinguished in part by ground and polished stone tools, pottery and other objects suggesting agriculture and domestication of animals.

Palaeolithic: The earliest division of the Stone Age also known as Old Stone Age, characterized by a core industry in southern India and by a flake industry round the Punjab in the North, respectively known as Madras and Sohan Industries.

Patination: The chemical change induced by weathering on the surface of stones and other artifacts. A criterion used in the classification of surface collections or those from a particular horizon.

Peri-glacial: The tract adjoining a glaciated region, denoting the effects of glaciation in unglaciated areas. Thus the peripheral area of the Potwar region is periglacial to the glaciated region of Kashmir.

Pleistocene: The first sub-division of the Quaternary, following in the sequence Eocene, Oligocene, Miocene and Pliocene of the Tertiary. It is defined for continental deposits as marking the appearance for the first time of true oxen, true elephants and true horses. This definition is rapidly acquiring world-wide acceptance for the demarcation of the Plio-Pleistocene according to the presence or absence of the three genera just named and the presence of any one of them should be sufficient reason for assigning a Pleistocene Age to the bed in which it is found. The Pleistocene is coeval with the Great Ice Age.

Pliocene: The ultimate division of the Tertiary, before the Pleistocene. The characteristic elephant is the Mastodon, and horse is represented by its ancestor the Hipparion.

Pygmy: Term used for microliths. The term is becoming obsolete as it induces erroneous associations with an unacceptable pygmy race of men as the makers of microliths.

Quaternary: The Age of Man, the last of the great geological time-phases, intervening between the end of the Pliocene period and the present day. Two divisions of the Quaternary period, Holocene (Recent) and Pleistocene, are usually recognized.

Regur: A product of weathering of surface rocks *in situ* in Peninsular India; the same thing as Black Cotton Soil.

Roppa Culture: A term from the name of the nearest village, given by Dr. Krishna at a site in Brahmagiri (Chitaldrug District, Mysore) for the basal microlithic stratum below a neolithic layer.

Siwāliks: A geological formation of fresh-water deposits 20,000 feet thick ranging in age from the Late Miocene to the Early Middle Pleistocene. Named after the Siwālik Hills of the Hardwār region between the Ganges and the Jumna rivers.

Sohan (Soan) Industry: Named after the Sohan river near Rawalpindi, a tributary of the Indus, where a new Palaeolithic industry was first discovered in 1936 by De Terra and Paterson. It is essentially an 'atypical' pebble-flake complex, the pebble receding early, and the flake reminiscent of the Clacto-Levalloisean of Europe and surviving into the Holocene.

Stone Technique: Applied in the oldest Abbevillian stage for making massive handaxes from a stone by using a stone hammer or striking the stone against a stationary stone anvil. The flaking is known as free flaking.

Tertiary: The penultimate geological epoch in the sequence: Primary, Secondary, Tertiary and Quaternary. During the closing stages of the Tertiary, Man made his appearance as a tool-maker.

Typology: Study and classification of artifacts by their shape and function.

Vaal Technique: Named after the Vaal River in South Africa. Also known as Pneil Technique from a site on the same river. The type-tool is an oval or pear-shaped biface sharp along one edge, the section being a narrow V. The undersurface is a single scar, while the upper is normally flaked. The thick edge is freely trimmed oblique to both surfaces.

Victoria West Type: A typical industry in dolerite of the Lower Palaeolithic in association with handaxe, first found at Victoria West in S. Africa. The tool is a rostrocarinate. The whole of its undersurface with the exception of a portion of the butt is a big hollow flake-scar, the result of a single blow. The butt end is boldly trimmed and free flaking on the upper surface leaves a keel along the middle.

Wood Technique: In the Acheulian stage of the Lower Palaeolithic the handaxes are neat, the flake scars flat, the cutting edge is straight, indicative of a controlled secondary working that seems to have been done by a wooden (or bone) mallet.

Zones: Geological horizons characterized by type-tools or type-fossils.

(Illustrations follow.)

FIG. 5. SOHAN INDUSTRY

Early Sohan Industry divided into three stages A→B→C based on patination and typology:

Early Sohan Pebble Tools

1 to 4, 'Flat-based' Types (Chopper of Movius).
5 to 11, 'Rounded Pebble' Types (Chopper of Movius).

Early Sohan Cores

12 to 16, 'discoidal and elongated' (Clactonian).
23-24, 27, 'Early Sohan C' (Levalloisean).

Early Sohan Flakes

No flakes in 'A'.
17 to 21, 'Early Sohan B' (Clactonian).
22, 25 and 28, 'Early Sohan C' (Clactonian-Proto-Levalloisean).

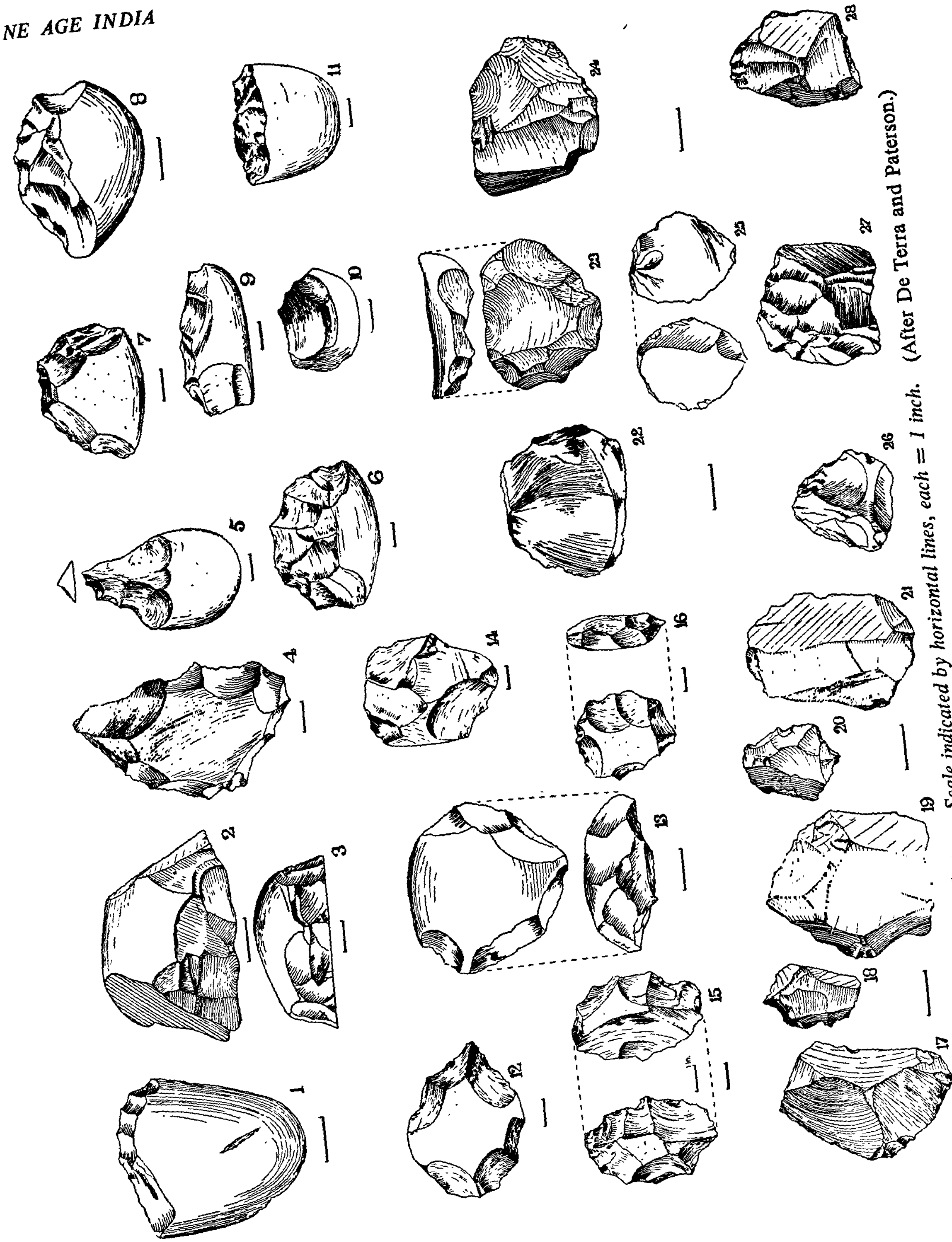


FIG. 5. *Sohan Industry. Scale indicated by horizontal lines, each = 1 inch.* (After De Terra and Paterson.)

FIG. 6. SOHAN INDUSTRY

Late Sohan Industry divisible into two stages A→B based on stratification, the former in the Potwar Basal Gravel and the latter in the Potwar Loess above the Gravels in Terrace 2.

Late Sohan A—Cores

1, 2, 3, 5 and 6, cores with flakes removed from opposite ends giving oblong and triangular shapes.
4, cores, circular with flat flaked base and conical upper surface.
8, cores of 'turtle-back' type.
7, 9, 10 and 11, cores, 'discoidal' with alternate flaking along the periphery giving a wavy edge and diamond-shaped section.
12, cores, chopper-type, triangular in section with thin pebble butt flaked on each side on the working edge.

Late Sohan A—Flakes

13, 15, 21, 23 and 24, characterized by convergent primary flaking and faceted striking platforms (Levalloisean).
14, 19 and 22, also Levalloisean but has a flake-scar covering nearly the upper surface.
16-17, 'pebble-flakes' roughly circular with steep free trimming all round the edge.

Late Sohan B

26, cores, oblong type as in Early Sohan: flaked across their length (cf. 2, 3 and 5) (Levalloisean).
25, 27, 28, 29, 30 and 31, flakes, rather elongated and blade-like triangular, and oval with faceted striking platforms and large primary flaking (Levalloisean).

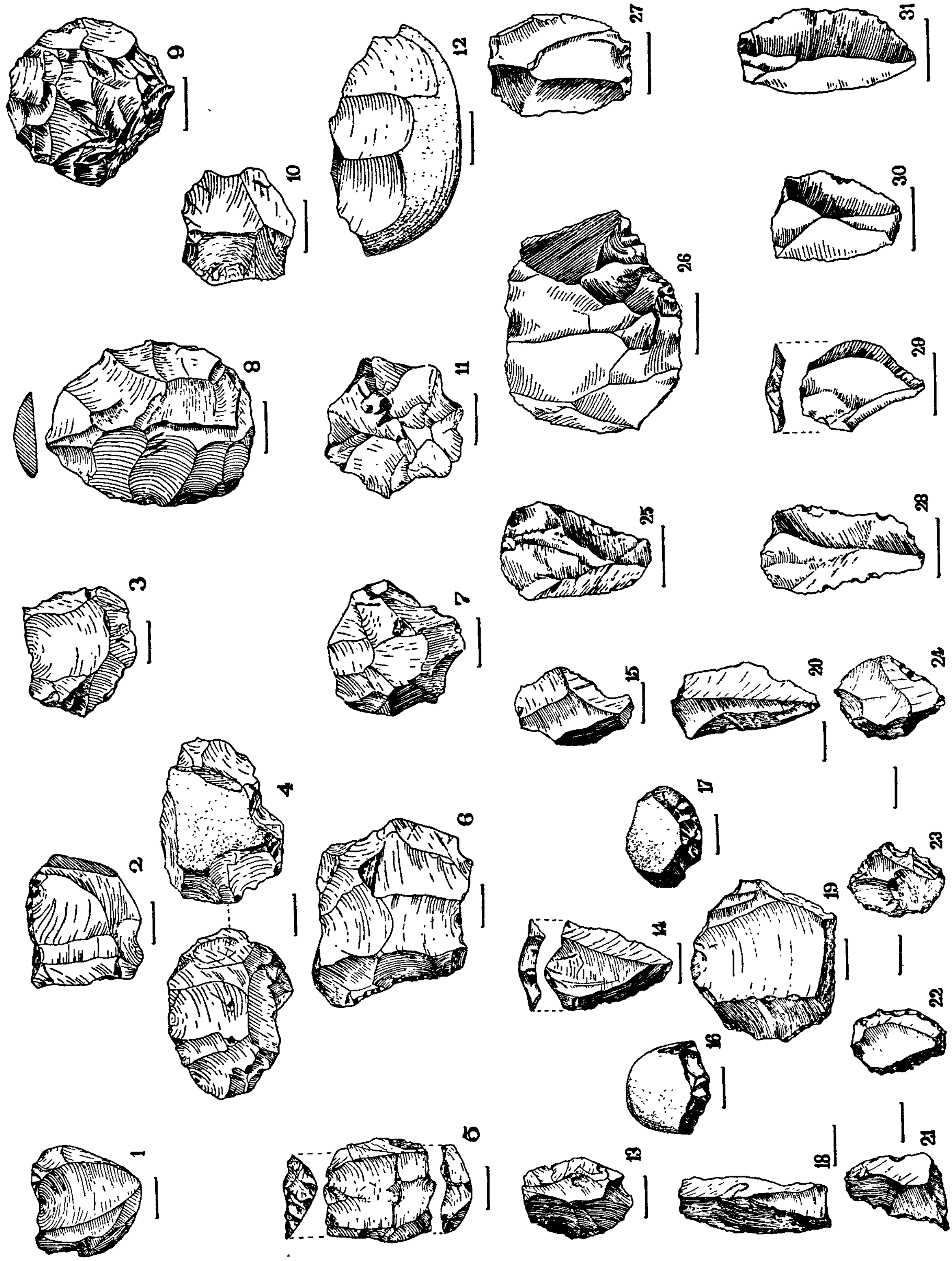


FIG. 6. *Sohan Industry. Scale indicated by horizontal lines, each = 1 inch.* (After De Terra and Paterson.)

FIG. 7. MADRAS INDUSTRY

(Essentially a *Coup-de-poing* or Biface Industry) *

Middle to Late Acheulean Types

1, pear-shaped *coup-de-poing* neatly trimmed all over by controlled flaking on both faces.
2, similar to 1 but with pebble butt.
3, cordate exhibiting secondary step-flaking along the margin.
4, similar to 3 (from Chingleput, Madras).
5, massive handaxe with chisel-shaped working end.
6, flat pear-shaped handaxe showing Vaal technique.
7, Victoria West type of handaxe.
8, ovate with delicate controlled working round the edge (from Godāvarī). (Reproduced from Ref. 8.)
9, similar to 8 (from Manjanakarani, Madras). (Reproduced from Ref. 8.)
10, handaxe similar to 5, see the controlled step-flaking, at the butt end and the broad chisel-end obtained by free flaking.
11, Victoria West Type like 7 (from the Kistna Basin). (Reproduced from Ref. 7.)
12, handaxe of Acheul type, rather crude (from Bombay). (Reproduced from Ref. 58.)
13, handaxe (from Bombay). (Reproduced from Ref. 58.)
14, handaxe of the Chauntra Industry in the Punjab. (Reproduced from Ref. 26.)

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* Locality Attirampakkam Terrace (Madras), when not indicated.

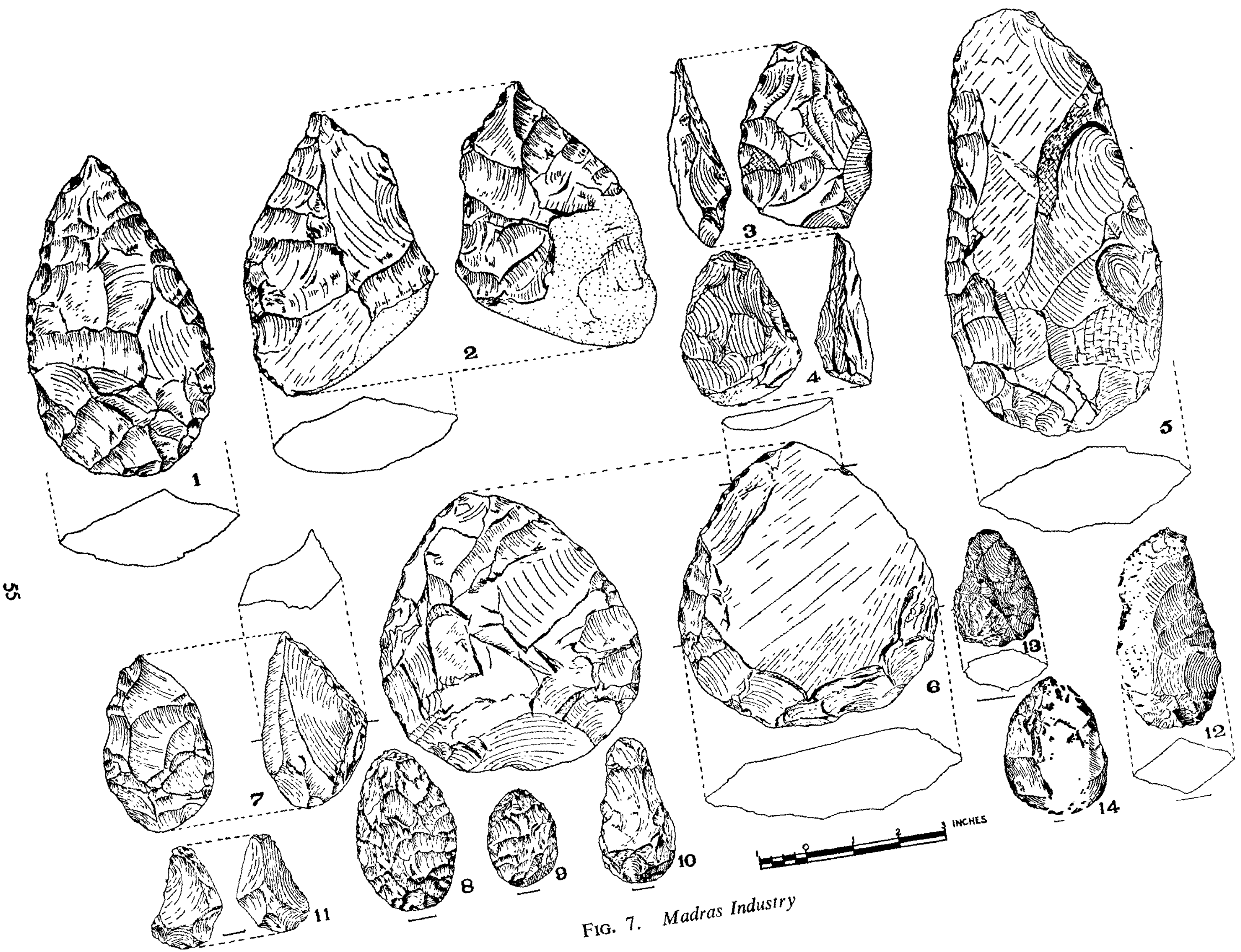


FIG. 7. *Madras Industry*

FIG. 8. MADRAS INDUSTRY

Middle to Late Acheulean Types *

1, ovate, showing Vaal technique.
2, 3, 4, elongated type of cores similar to the Early Sohan.
5, 8, 9, cleavers, showing Vaal technique.
6-7, discs obtained by Acheul technique.
10, cleaver, the butt trimmed as in handaxe (from Bombay). (Reproduced from Ref. 58.)
11, Clacton core similar to Sohan.
12, elongated thick flake (blade-like) with plain striking platform and large primary flaking on upper surface (Proto-Levallois).
13, Levallois core.
14, flake (Clacton).
15, large Levallois flake-scraper with faceted striking platform showing secondary marginal trimming.
16, Levallois blade.

* Locality Attriampakkam Terrace (Madras), when not indicated.

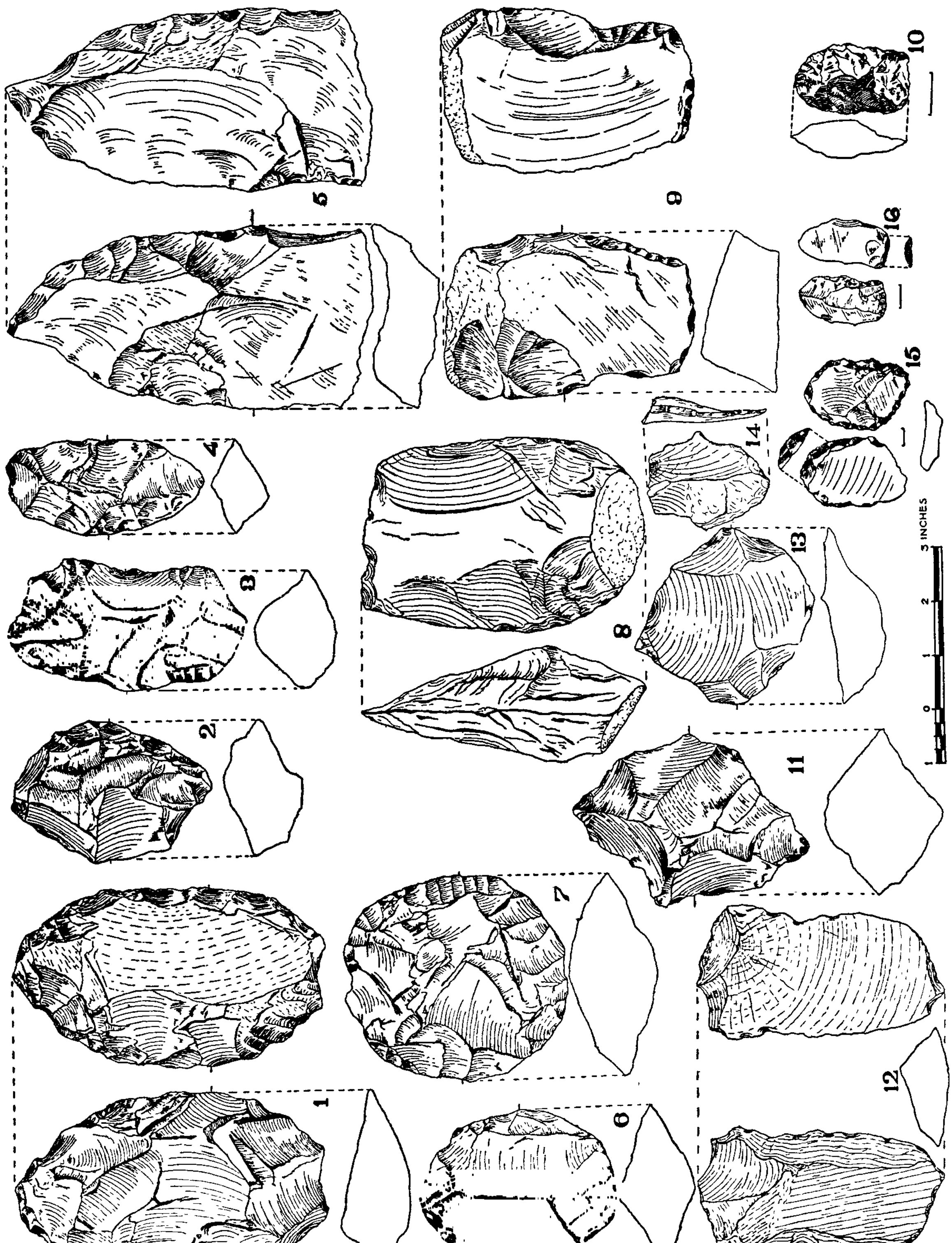


Fig. 8. *Madras Industry*

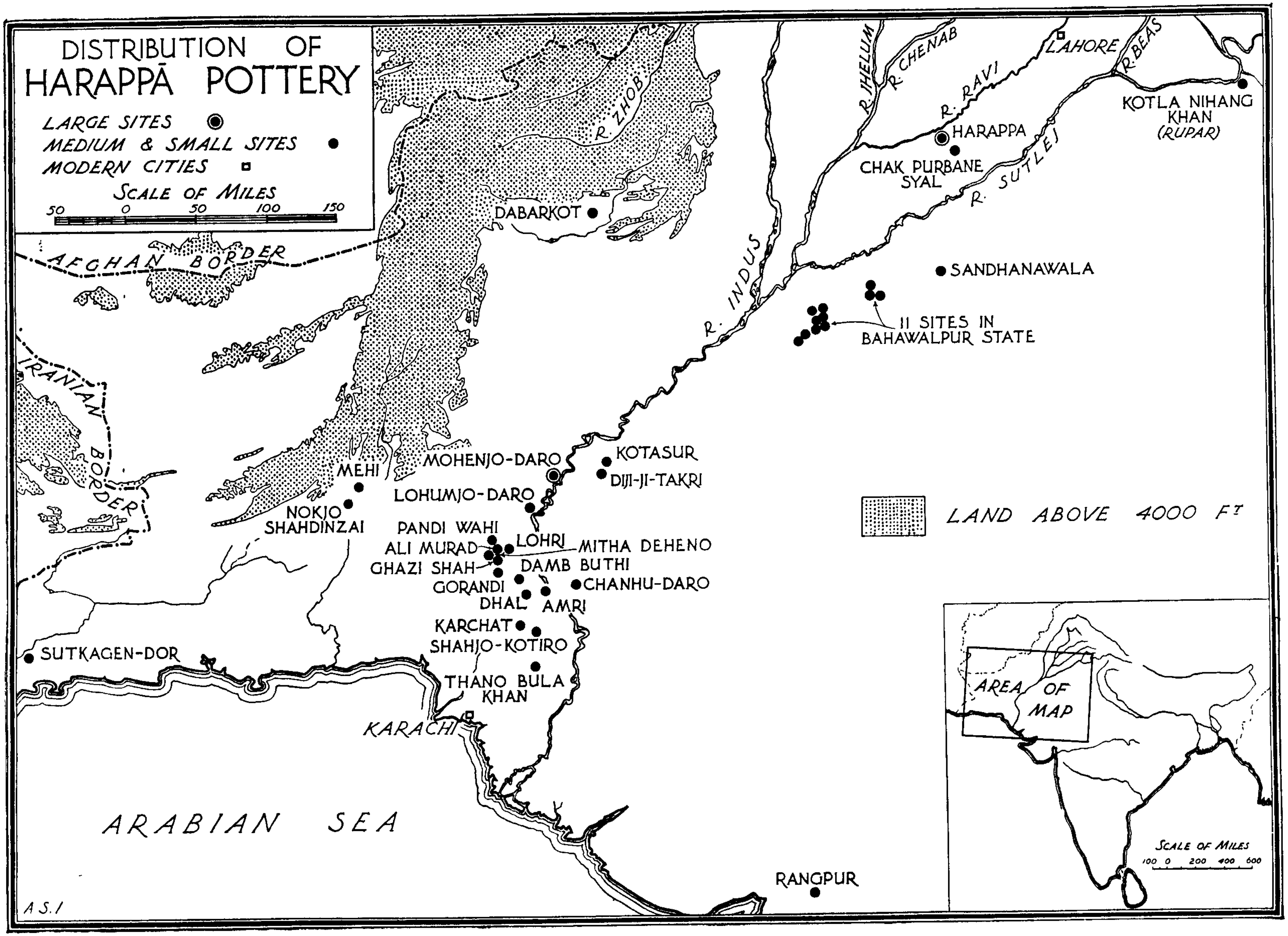


FIG. 1. (See p. 129.)

HARAPPĀ 1946:

THE DEFENCES AND CEMETERY R 37

By R. E. M. Wheeler

The earliest known civilization of India has been labelled vaguely the 'Indus' Valley' civilization from its general distribution, but its more precise designation is the 'Harappā' civilization from the little town in the Montgomery district of the Punjab where its distinctive elements were first recognized a quarter of a century ago. Its discovery at once prolonged the story of civilization in India backwards into the third millennium B.C.; but its subsequent exploration both at Harappā and at Mohenjo-daro and Chanhu-daro in Sind, although revealing certain possible affinities with historic India, presented in the main a picture of detachment, of sudden and uniform efflorescence devoid alike of genesis and decay. Its life and death, its biography, could not yet be written. Brave attempts in recent years to find some hint of its ancestry in the scattered prehistoric cultures of Sind, Baluchistan and Iran have so far failed to produce any very significant result. It has remained essentially an abstraction.

The recent re-opening of the problem by a season's work at Harappā (already subjected to eleven years of intensive exploration in the twenties and thirties of the century) has not removed the anomaly but may be claimed to have reduced its proportions. We can now trace at Harappā certain elements of adolescence, maturity and decline. The apparently unwalled town or village, associated with an alien or variant ceramic industry, was followed by the arrival of the Harappan culture and the building of a citadel with imposing defences; after a considerable interval, these were reconditioned, at a time when the local craftsmanship was at its prime; later, the reconstructed fortifications were further reinforced and a gateway blocked by a city now presumably on the decline; and finally an intrusive culture occupied a part of the site above layers of débris. The sequence is one with historic parallels which enable us to fill in some of the human details, and helps materially to vitalize the 'abstraction'. If we may go further, as is tentatively proposed in the following paper, and, in the light of the new evidence, associate the fall of Harappā with the protohistoric advent of the Āryans, then the Harappā civilization at last becomes an integral episode in the story of the Indian peoples. But in the present state of knowledge no undue stress is laid upon that possibility.

Sociologically, too, the recent discoveries have something to tell us. The Harappā civilization was of a centralized type, comparable in kind with the contemporary civilizations of Sumer and Egypt. A hint of this had already been implicit in the superficial aspect of the civilization. Between the Arabian Sea and the foot of the Simla hills, a distance of a thousand miles, thirty-seven sites yielding 'Harappā' relics have been noted (fig. 1). Of these it would appear that only two are of outstanding size: Harappā itself and Mohenjo-daro, a little larger than Harappā, both cities standing in isolated grandeur on the Indus plain. The rest are relatively small mounds or tells, representing villages rather than towns. The imperial status of the two cities would appear to have been domestically unchallenged, whether, at a distance of nearly four hundred miles from each other, they represent two régimes or one. We now know that each of them was dominated by a massively fortified citadel, and must therefore have been subjected to autocratic or bureaucratic 'citadel-rule', its precise form at present unknown and unlikely to be known until perhaps some happy discovery unlocks the Harappā script.

The present excavations have also uncovered a further portion of the Harappan 'cemetery R 37' discovered in 1937, and have established its stratigraphical relationship with the intrusive

'cemetery H' previously recorded. Cemetery R 37 establishes the burial-rite (extended inhumation) of the mature Harappā civilization, and incidentally presents a further analogy with Sumer.

CONTENTS

1. INTRODUCTORY

HARAPPĀ, the type-site of the Indus Valley civilization of the third millennium B.C., was first visited by Charles Masson in or about 1826. It had long been a source of bricks for local buildings and subsequently provided brick-ballast for a hundred miles of the Lahore-Multān Railway. In and after 1853 Sir Alexander Cunningham visited the site and one of the seals now known to have been typical of the Harappā culture was recorded by him.[1] This with others in the British Museum roused the curiosity of Sir John Marshall, and at his initiative the excavation of the mounds was begun by Rai Bahadur Daya Ram Sahni in January, 1921, over a year before the initial exploration of Mohenjo-daro. Between 1926 and 1934, major excavations were carried out at Harappā by Mr. M. S. Vats, whose two volumes constitute the substantive work on the subject.[2]

The site, some $3\frac{1}{2}$ miles in circuit, lies beside an old confluence of two branches of the river Ravi, a tributary of the Indus. The Ravi now flows six miles to the north

[1] *Archaeological Survey of India Report V, for 1872-3* (Calcutta 1875), 105–8.

[2] *Excavations at Harappā* (Manager of Publications, Delhi, 1940), 2 vols.

of the mounds, and these are relatively dry. But anciently it may be supposed that, in a climate appreciably damper than that of the present day,[1] the flat plain which surrounds the town was liable to occasional flooding, and that the formidable bund which is now known to have formed the basis of the fortifications of the principal mound may have been designed partially as a defence against this risk.

The extensive spoliation of Harappā in modern times has robbed its structural remains of the coherent plan which today makes Mohenjo-daro one of the most spectacular ancient cities of the world. Nevertheless, Harappā presents features which are either not available or so accessible at Mohenjo-daro, and two of these, the defences and the cemeteries, were partially explored by the Archaeological Survey of India in 1946. The work was carried out by the Excavations Branch of the Survey under my direction as Director General, with assistance from Mr. B. B. Lal (Assistant Superintendent in charge of the Branch), Mr. B. K. Thapar, Mr. H. K. Bose (Anthropological Assistant), and thirty students from the Indian universities. In the preparation of the report, special assistance has been given by Mr. A. Ghosh, Mr. B. B. Lal, Mr. Krishna Deva and Mr. S. C. Chandra. Grateful acknowledgment is also due to Mr. Ballabh Saran, surveyor, Mr. Raghbir Singh, draftsman, and Mr. S. G. Tewari, photographer.

2. THE DEFENCES

(*a*) General

Cunningham referred vaguely to 'the remains of the walled town of Harappā',[2] but it would appear from the context that the phrase is intended merely to distinguish the high mounds of the site from the vestiges of occupation on the lower ground round about. Masson had camped 'in front of the village and ruinous brick castle',[3] the latter doubtless the small Moghul fort which now encloses the police-station on the eastern flank of the site. Burnes, about 1831, in referring to 'a ruined citadel on the river (i.e. northern) side of the town'[4] was presumably referring to the high mound AB rather than to the Moghul fort and so perhaps anticipated a result of the recent excavations, but, like Cunningham, may be suspected of identifying his 'citadel' rather by the magnitude of the mound than by any coherent and obvious system of defence still surviving in his time. Certain it is that subsequent explorers both here and at Mohenjo-daro have failed to identify definite fortifications. At the latter place, indeed, Sir John Marshall tentatively assumed the former existence of town-walls,[5] and E. J. H. Mackay had to suspend his excavations whilst in the act of examining a substantial structure which he was 'inclined to think was a part of the city wall', 100 yards to the north-east of the stūpa mound.[6] This was in accordance with Marshall's forecast that 'it is clear that any fortifications it (Mohenjo-daro) may have then possessed would have stood, not on the rising ground in the heart of the city, but on the then level of the plain, which appears to have been some 25 to 30 feet below its present level'. These suppositions were reasonable enough and may yet be found to contain a part of the truth; but the apparent absence at Mohenjo-daro, a site where many

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[1] For the climatic problems presented by the Indus Valley Civilization, see J. Marshall, *Mohenjo-daro and the Indus Civilization* (London, 1931), I, 2ff. Cf. M. S. Randhawa, 'Progressive desiccation of northern India in historical times', *Journ. Bombay Nat. Hist. Soc.*, XLV, No. 4, 1945, pp. 558ff.

[2] *Ancient Geography of India*, edited by S. M. Sastri (Calcutta, 1924), p. 242.

[3] C. Masson, *Narrative of various Journeys in Balochistan, Afghanistan*, etc. (London, 1842), I, 452.

[4] A. Burnes, *Travels into Bokhara* (London, 1834), III, 137.

[5] Op. cit., I, 9.

[6] *Further Excavations at Mohenjo-daro* (Manager of Publications, Delhi, 1938), I, 4.

structures are in so remarkable a state of preservation, of any certain vestiges of what must have been the most extensive and substantial structure of them all had encouraged the logical conjecture that the Indus Valley civilization was politically and socially in advance of the king-ridden or priest-ridden societies of the West, and had precociously reached a phase of comparatively quiescent democracy, a 'bourgeoisie economy', devoid of what may conveniently be called 'citadel-rule'. The relative scarcity of military equipment supported this inference.

That in the outlands of the Indus area small towns or villages were occasionally fortified (possibly in some cases as police-posts) does not affect the main problem.[1] Village-fortification is a normal principle of self-help in the East and has no wider implication.

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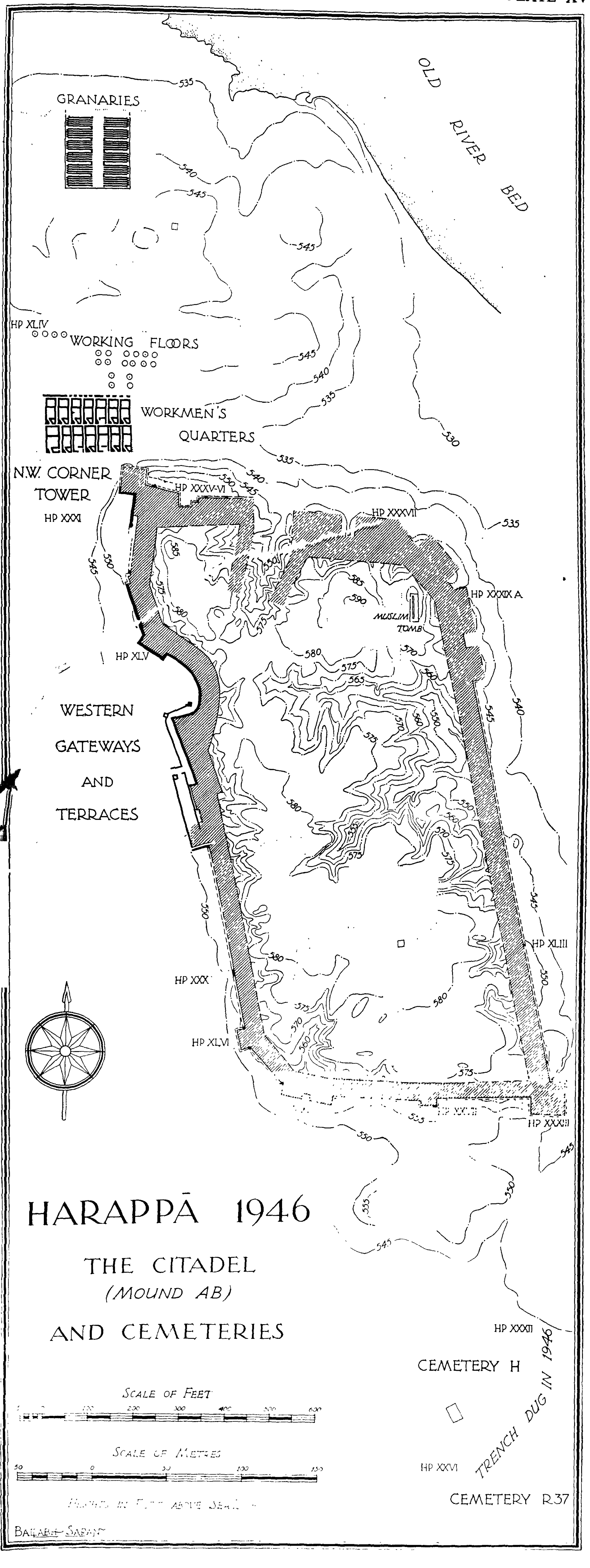
Reference to the general plans of Mohenjo-daro and Harappā (fig. 2) will show in both an inchoate mass of mounds towards the east and a detached, small and relatively compact mound towards the west. At both places, the detached mound is the highest and most imposing on the site; at both it is roughly a parallelogram in shape, with the major axis north and south; and at both it is approximately 400 yards from north to south by 200 yards from east to west. At Mohenjo-daro the detached mound is known as the 'stūpa mound'; at Harappā it is 'mound AB'. The remains of buildings unearthed on the latter are too fragmentary for reconstruction, but on the stūpa mound of Mohenjo-daro were found the most individual and notable buildings of the city: the celebrated bath-building, the 'collegiate building', the pillared hall, and perhaps the unknown building and platform under the Kushāṇa stūpa. This assemblage has no parallel elsewhere in the excavated town, and may be thought to indicate a centre of religious or administrative life on a significant scale. The almost identical size and orientation of the equivalent mound at Harappā suggested something more than pure coincidence, and the presence, immediately beside this mound, of serried lines of barracks or cooly-quarters, working-platforms and granaries (see below, p. 76) filled out a picture of centralized and disciplined citadel-rule which at least seemed to merit further investigation.

It was therefore no great surprise to me to find, on visiting Harappā for the first time in 1944, that mound AB, scarred and riven by three or four thousand monsoons, was still manifestly ringed by towering masses of mud-brick, the clean, pale masses of which emerged intermittently in sharp contrast to the reddened heaps of débris round about them (pl. XVI). In places, notably at the north-east and north-west corners, these mud-brick ruins rose to a height of 35–50 feet above the surrounding plain. On reference to the excavation-report I found that on the southern side of the mound a portion of this structure, nearly 40 feet wide with an external offset of 12-13 feet, had been planned as 'mud-brick infilling'[2] and allotted provisionally to Stratum V or VI from the top. It was an easy step to link up these vestiges and to identify them with the missing defences of the dominant portion of the site.[3] The unlikelihood that mud-brick had been used exclusively for this exposed

[1] N. G. Majumdar, 'Explorations in Sind', *Memoirs of the Archaeological Survey of India*, No. 48 (Delhi, 1934), pp. 89, 133, 147, records two such sites with stone or stone-and-mud defences: Ali Murād and Kohtras, both in western Sind. The former is of the 'Harappā' culture, the latter perhaps of the slightly earlier 'Amri' culture. At Sutkagēn-dōr in Makrān, Sir Aurel Stein found an oblong brick fortification, perhaps 170 yards by 125 yards, with Harappā pottery.—"An Archaeological Tour in Gedrosia", *Mem. Arch. Survey of India*, No. 43 (Delhi, 1931), pp. 60 ff.; and *Archaeological Reconnaissances in North-Western India and South-Eastern Iran* (London, 1937), pp. 70-1, where the spelling of the name is corrected.

[2] Vats, I, 177 and II, pl. XXXV.

[3] This identification was subsequently supported by Stuart Piggott, *Some Ancient Cities of India* (Oxford University Press, 1945), p. 15.


OLD RIVER BED
GRANARIES
HP XLIV
WORKING FLOORS
WORKMEN'S QUARTERS
N.W. CORNER TOWER
HP XXXV-VI
HP XXXI
HP XXXVII
HP XXXIX A
MUSLIM TOMB
HP XLV
WESTERN GATEWAYS AND TERRACES
HP XLIII
HP XXX
HP XLVI
HP XXVII
HP XXXIII
HARAPPĀ 1946
THE CITADEL
(MOUND AB)
AND CEMETERIES
HP XXXII
CEMETERY H
TRENCH DUG IN 1946
SCALE OF FEET
SCALE OF METRES
HP XXVI
CEMETERY R37

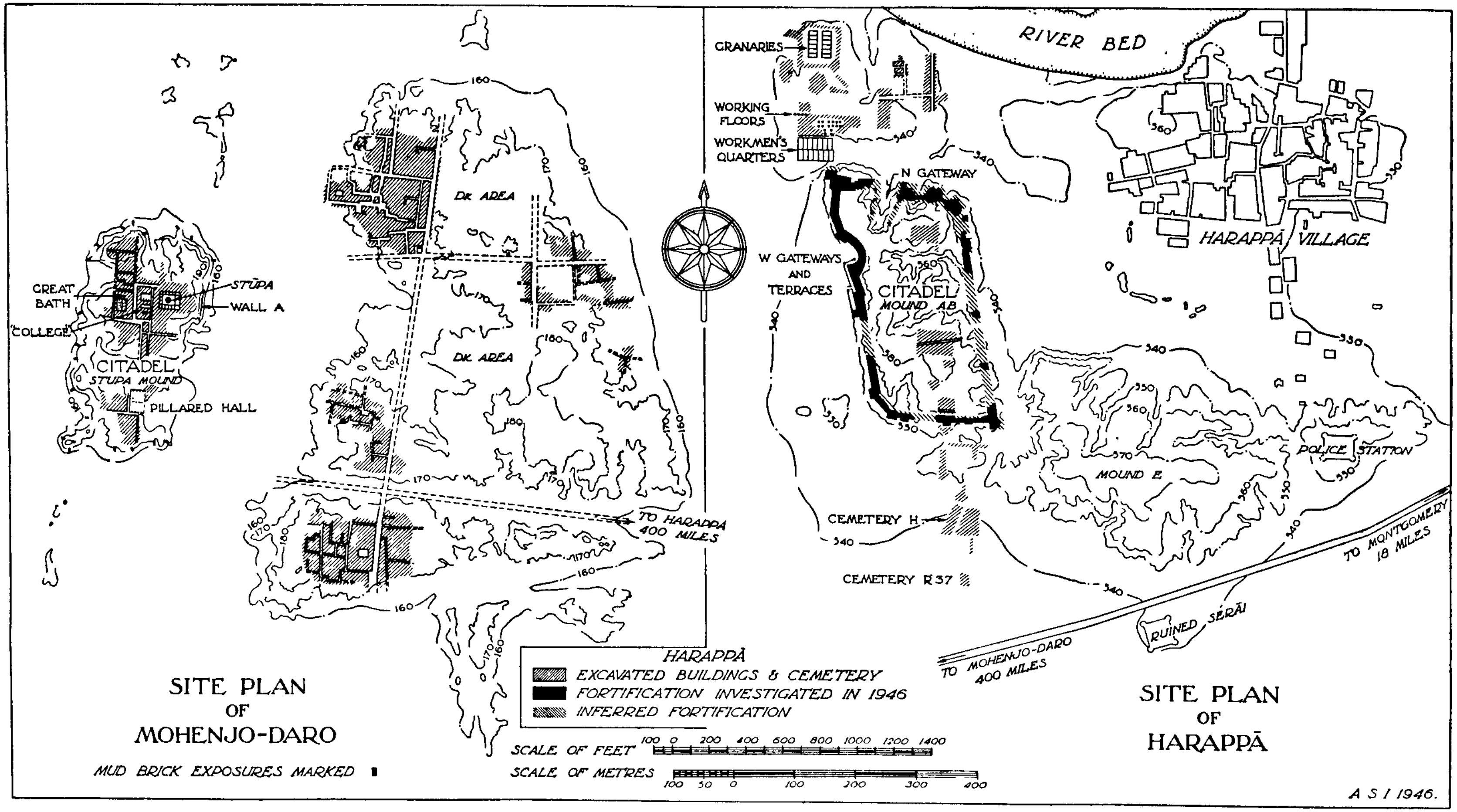


FIG. 2. *Comparative plans of the principal mounds at Mohenjo-daro and Harappā*

structure at a time when baked brick was otherwise almost universal here suggested the further likelihood of a former baked brick revetment.

A subsequent examination of the stūpa mound at Mohenjo-daro helped to confirm these inferences. The local conditions there have, however, differed considerably from those at Harappā. The remoteness of Mohenjo-daro has prevented the systematic brick-quarrying which has completely broken up the internal plan of the main Harappā mound; accordingly, as noted above, extensive and coherent remains of buildings have been revealed there by excavation. At the same time the resultant spoil-tips now obscure the outline of the mound and impede superficial observation. Furthermore, whilst the Harappā site is now relatively high and dry, that of Mohenjo-daro is liable to dangerous flooding from the Indus, a mile away, and only the construction of long stretches of embankment or bund has in recent years precariously restrained the annual flood. It is clear that the destruction of a considerable part of the stūpa mound, leaving re-entrants and hummocks with projecting brickwork, must be attributed to pre-bund flooding.

In spite of these difficulties, a cursory examination of the stūpa mound indicates quite clearly the presence of a continuous mud-brick periphery, except on the eastern side where the full impact of the Indus-floods has removed any possible evidence. At twenty-one points the mud-brick has recently been shown by scraping the surface, and at the south-eastern corner the angle of a tower or salient can be detected. These points are marked on the site-plan (fig. 2), and, although no baked brick revetment of the Harappā type has yet been proved (or disproved),[1] they demonstrate adequately, short of specific digging, the former presence of a mud-brick circuit-wall. In the northern end of the mound there is evidence, as at Harappā, of a marked re-entrant which presumably indicates the position of the main entrance; whilst towards the southern end of the western side a semicircular 'bite' is significantly like the re-entrant on the western side of Harappā. Finally, evidence of a considerable mud-brick platform, comparable with that now known to have existed at Harappā, was noted by the excavators in the northern end of the stūpa mound.

(*b*) Summary of Results

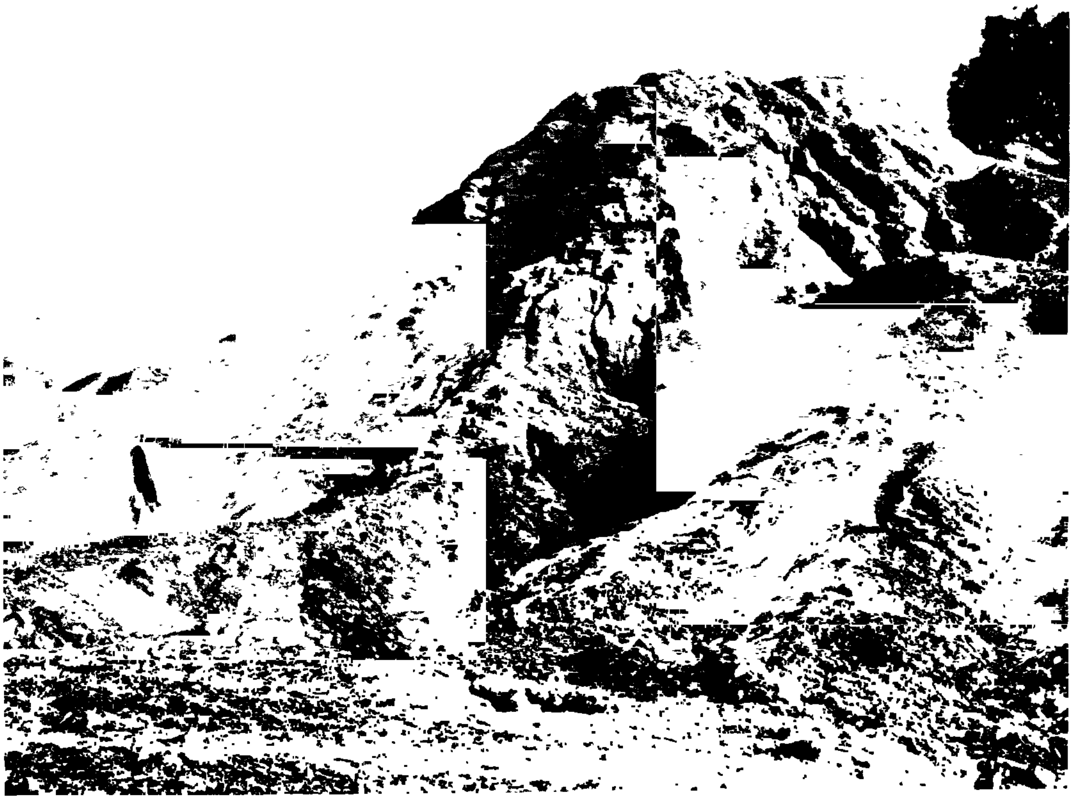
The Harappā excavations of 1946 were of restricted extent, and, in so far as the problem of the fortifications was concerned, had two main objectives: first, to establish the existence or absence of a defensive system round mound AB, and, secondly, to ascertain the general relationship of such a system, if found, to the main stratification of the site. It may be said at once that, within these limits, the excavations were wholly successful in the positive sense. In summary, the results were as follows:—

(1) After a preliminary occupation of the site or its vicinity, accompanied by extensive periodical flooding and associated with a variant or alien ceramic industry, mound AB was heavily fortified. In the area excavated, the fortification marks the arrival of the mature Harappā culture.

(2) The plan of the defences falls roughly within the limits of a parallelogram, 400 yards by 200 yards, with a 'bite' out of the western side, and a western gate-system of complex plan, with terraces clearly designed for ceremonial purposes. A re-entrant on the northern side probably represents a further (perhaps the main) entrance.

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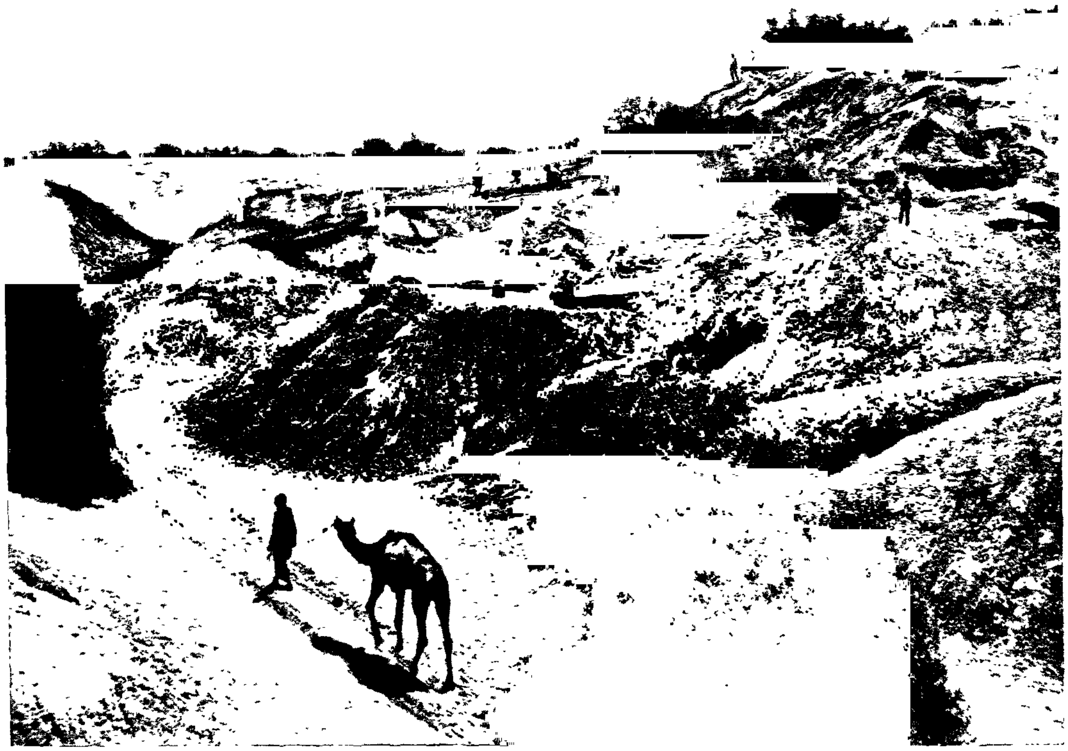
[1] A vertical baked brick wall on the eastern side of the stūpa mound, known as 'wall A', is probably not a part of the defences. But nothing is known about it—not even its thickness. Marshall, op. cit., I, 125.



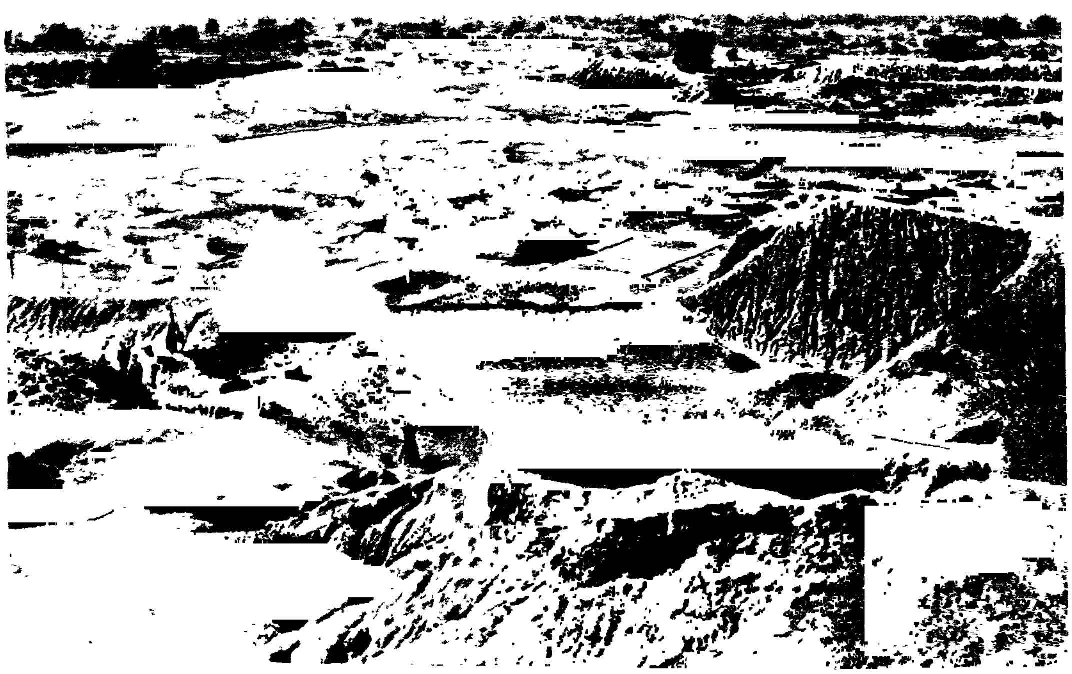
A. *The Harappā citadel: the unexcavated north-east corner, showing the mud-brick nucleus of the defences*



B. *The citadel defences: north-west corner before excavation, showing mud-brickwork*



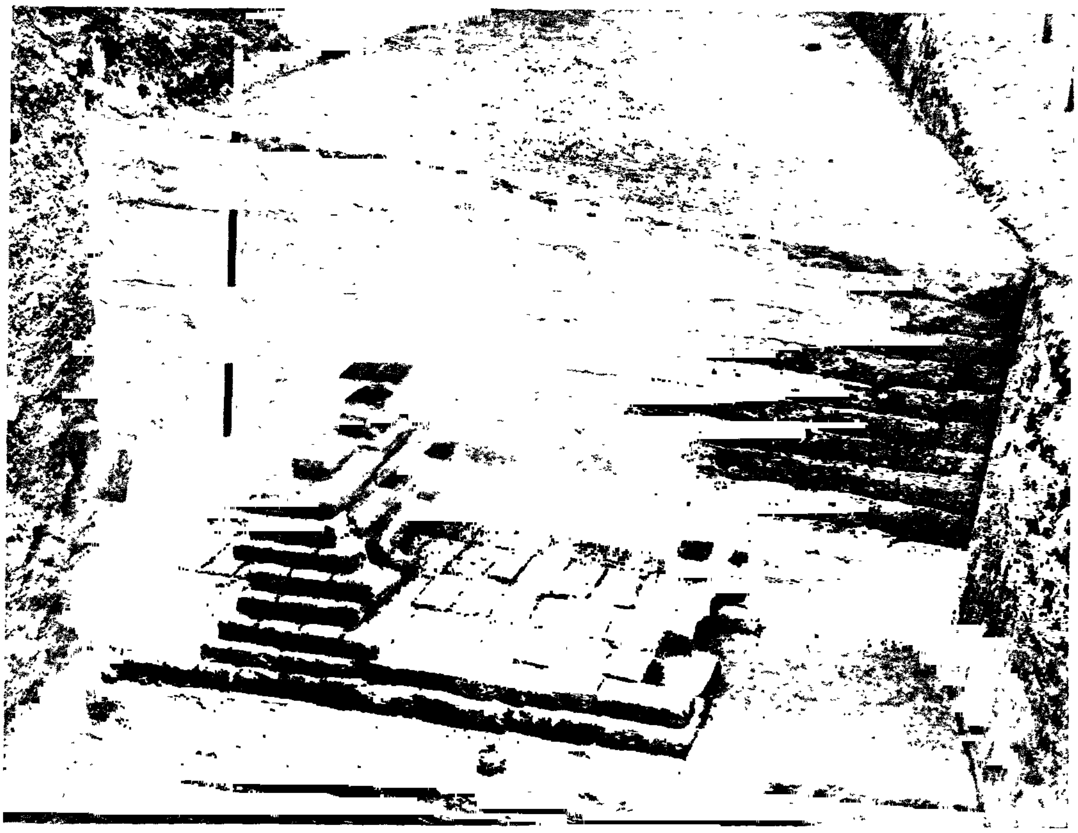
A. *The Harappā citadel: the north-west corner during excavation*



B. *View from the northern end of the citadel towards the working-platforms and the old river-bed*

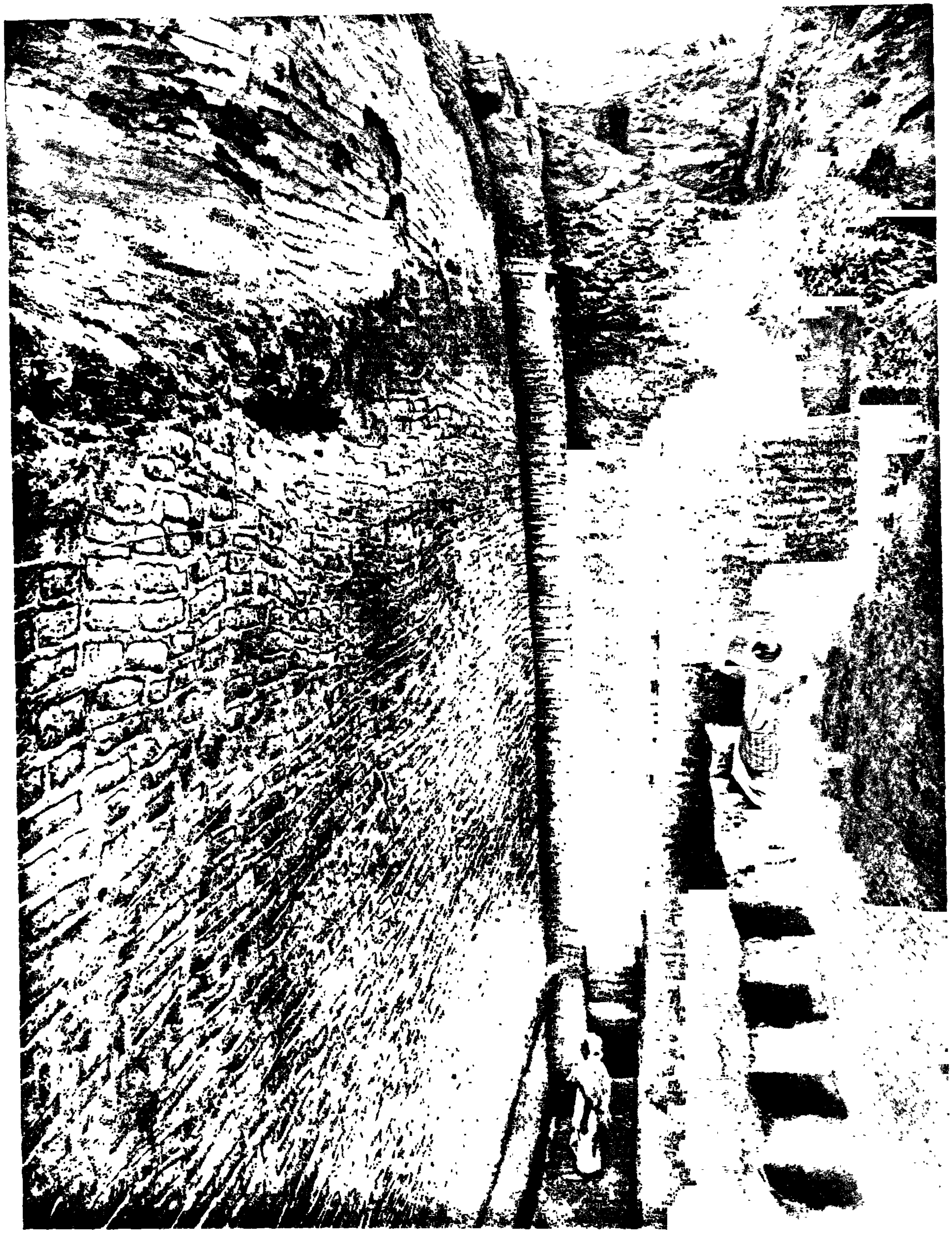


A. *The citadel defences: site HP XXX before excavation, showing mud-brickwork*



B. *Cutting HP XXX: face of mud-brick defensive wall, with fragment of baked brick revetment*

To face plate XX

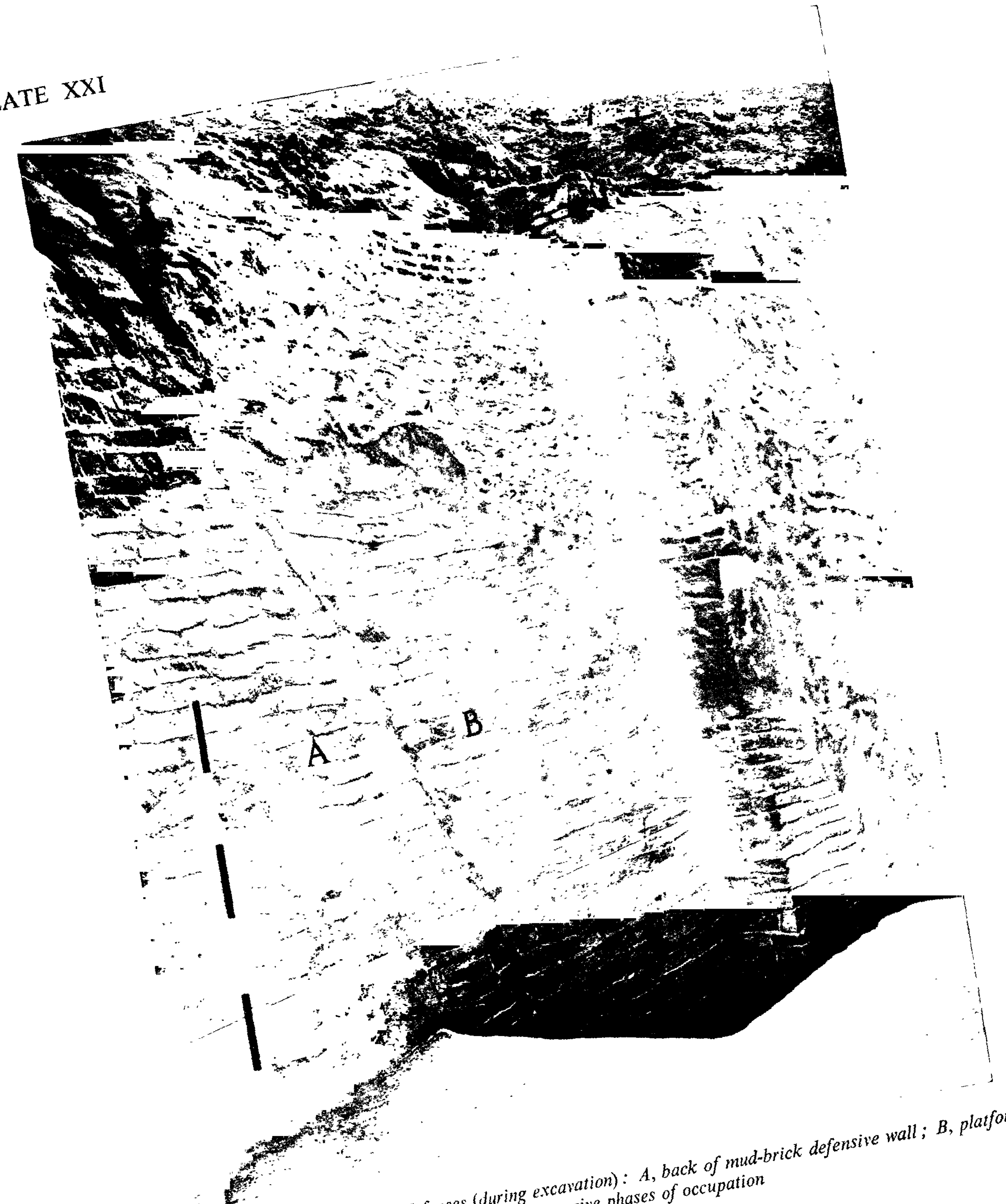


Cutting HP XXX from the west. The view shows part of a complete section through the defences of the Harappā citadel: the dark band at the feet of the lower figure is the natural soil, on the left is the mud-brick defensive wall (in section), and at the back (top) are the successive layers of occupation on the platform. Cf. pl. XXII.



Cutting HP XXX through the defences (during excavation): view from the west. The dark band by the lowest figures is the natural soil; the squatting figure near the top is beside the baked brick revetment of the mud-brick defensive wall, which appears on his right.

PLATE XXI



Cutting HP XXX through the defences (during excavation): A, back of mud-brick defensive wall; B, platform, capped by successive phases of occupation

(3) The defensive wall overlies and is integral with a rampart or bund, 10–20 feet high, built up of mud and débris with a nucleus of mud-brick.[1] Its function was presumably to raise the base of the defences proper above flood-level. Extensive weathering in ancient times had so damaged the outer face of this rampart that its original contour was not obtainable in the only deep cutting, section HP XXX (pl. XXII); but at the western gate-system its outer shoulder was terraced, with retaining-walls of baked and unbaked brick.

(4) On this bund stood the main wall, of mud-brick battered externally and internally, with a basal width of 40 feet and a height of upwards of 35 feet. Externally, the wall was revetted with a facing of baked brick, battered back to a slope of 23–31 degrees from the vertical.

(5) The wall was reinforced by rectangular towers or salients representing an elaborate system of enfilade. The surviving masses of mud-brick core suggest that some at least of these salients were carried higher than the main wall.

(6) Retained by the rampart and the lower part of the superimposed wall was a co-eval platform of mud and mud-brick rising to a height of 33 feet and designed to carry the internal buildings of the citadel.[2] The remains of these buildings in section XXX indicate six successive structural phases, a number agreeing with that noted previously elsewhere on mound AB by Mr. Vats.

(7) The defences show three periods of construction. After a long period of weathering and other damage, the original baked brick revetment was rebuilt and, particularly at the north-west corner, considerably thickened. Unlike the older work, which was constructed largely of brickbats, the new work was built in first-class fashion, with complete bricks. This phase represents the apogee of the Harappā civilization. Subsequently, the north-west corner was strengthened by an additional salient and, significantly, two entrances of the western gate-system were wholly or partially blocked. In this late phase of the city, the Harappans were on the defensive.

(8) Lastly, the site of the western terraces was occupied by roughly-built dwellings, constructed evidently at some distance of time above a layer of débris, and associated with the intrusive ceramic of 'Cemetery H'.

(*c*) The Cuttings across the Defences

The cuttings made across the line of the defences will now be described in topographical sequence, beginning from the deep cutting, HP XXX, on the western side and proceeding

[1] Comparison may be made with the partly contemporary rampart upon which stood the town-wall of Ur. This rampart served as the base of the wall proper and as the revetment of a canal or river bank. C. L. Woolley in *Antiquaries Journal*, IX (1929), 336ff., and X (1930), 316ff.

[2] Compare the platform of Sialk VI (central Iran). This, however, is ascribed to the tenth or ninth century B.C., and it may be doubted whether the comparison is significant. See R. Ghirshman, *Fouilles de Sialk* (Paris, 1939), II, 23ff. Similarly at Turang Tepe in north-eastern Iran a revetted brick platform appears to exist on "mound A", ascribed vaguely to the Bronze Age; but the preliminary burrowings into the site did not produce definitive information. See F. R. Wulsin in *Supplement to the Bulletin of the American Institute for Persian Art and Archaeology*, II (New York, March 1932), 5-6. A small brick platform was also found, as Professor Piggott points out to me, at Nad-i-Ali in Afghan Sīstān; but it is ascribed to a date even later than that of the Sialk platform and, like the latter, does not appear to be a significant analogy. See R. Ghirshman in *Revue des Arts Asiatiques*, XIII, No. 1 (Paris, 1939), 14 ff.

clockwise round the periphery of the mound. The West Gates and Terraces will be dealt with separately (p. 70).

Cutting HP XXX (pls. XVIII–XXII and XXV A)

This cutting presents a comprehensive picture of the character of the defensive wall and covers the whole range of the occupation at this point. It may fairly be described as a complete section of the Harappā civilization. It was 111 feet long and 12–18 feet wide, and was throughout cut down into the hard natural clay. Immediately over the latter were five layers, numbered 26–30, of which only the uppermost, No. 26, constituted an occupation-layer. It was of very considerable archaeological interest since its pottery was not of normal Harappā type and indicates a variant or even alien culture hereabouts prior to the arrival of the Harappans and the building of the defences (see below, p. 91). Beneath layer 26, layers 27, 29 and 30 were clean deposits of alluvial mud containing only a few sherds, mostly of pin-head size and in some cases in root-holes. Layer 28 was also alluvial, but was of a somewhat more earthy texture, suggesting that it may have been ploughed and sown ; it was, however, similarly deficient in significant pottery. The most that can be said is that at the time of the deposition of these layers there was some slight occupation in the vicinity; but the deposits themselves were wholly or mainly the product of considerable inundations.

The defensive structure above them may be subdivided into four parts, all co-eval save for the possible rebuilding of (iii): (i) the substructure, here named the bund or 'rampart'; (ii) the mud-brick wall; (iii) the baked brick revetment; and (iv) the internal platform. To these may be added (v) the successive layers of occupation on the platform.

(i) *The 'rampart'.*—It was doubtless because of the periodical flooding that the first step in the construction of the defences was the erection of a substantial bund or rampart of mud and mud-brick to a height of 10 feet above the average level then obtaining. The layers of alluvium however did not present a uniform surface. At two points they had been cut by monsoon-channels, shown in the section; the more westerly of these had filled itself with in-washed mud, whilst the more easterly, lying under the front of the proposed superstructure, was now carefully filled with mud-brick, thus carrying the 'rampart' to a further depth of 12 feet at this point.

In the section, the 'rampart' had lost its outer contour through weathering. There is evidence at the West Gates that it had been terraced or retained by one or more walls, but whether in the present section the fragmentary mud-brick wall 'X', 14 feet in front of the face of the main mud-brick superstructure, represents a further terrace at this point cannot be determined.

(ii) *The mud-brick wall.*—At the back, superstructure and rampart were from the outset one and the same. In the early stages the back face was carried up vertically, layer 26A marking the accumulation of building-débris during this process. The increasing weight, however, of the sloping masses of mud-brick added by the builders progressively from back to front (as clearly shown in the section) distorted the vertical back, and, when the work had reached the height of 15 feet, a battered buttress was added here, its slope being thereafter continued upwards as the construction proceeded. The front face of the superstructure conformed, producing a mud-brick wall 39½ feet wide on the level of its front base and tapering upwards, front and back, at angles of 13–20 degrees from the vertical. In the present section, the wall is preserved to a height of 20 feet above the front base and 30 feet above the back base.

(iii) *The revetment.*—The outer face of the mud-brick wall had been protected by a revetment of baked brick. This stood here to a height of 2½ feet but elsewhere survived to a maximum height of 7½ feet, tapering upwards (see fig. 3). Its outer face was battered

back to an angle of 23°. To judge from its character, the brickwork was at this point a re-build of the second of the three structural phases of the defences. (Pls. XVIII B and XXV A.)

(iv) *The platform.*—Behind the rampart, and of one build with it, was a platform of mud and mud-brick, which was carried up behind the lower part of the mud-brick wall. Its top was at a height of about 16 feet above the outer base of the wall. A low retaining wall (D on section), consisting of three courses of baked brick alternating with courses of mud-brick, was incorporated in the platform.

(v) *The occupation of the platform.*—As the digging was essentially vertical and not horizontal, no complete plans of the successive buildings on the platform were obtained. The walls represented stratigraphically six structural periods, with no signs, however, of any complete interruption between them. The periods are here labelled from bottom to top. The structural record of so small an area lacks intrinsic interest but it is of considerable importance to note that the pottery was substantially uniform 'Harappā' throughout.

Cuttings HP XXX F, E and G

These were small cuttings immediately north of HP XXX to ascertain the alignment of the outer face of the mud-brick wall. No other features of interest were revealed.

Cutting HP XLV (pl. XXVII A)

This cutting revealed a tower or salient covering an inward bend of the wall. The salient was 60 feet broad and, excluding revetments, projected 15 feet at its south-eastern end and 23 feet at its north-western end. Immediately north of the salient, the mud-brick wall was here 43 feet broad, but south-east of the salient it was of the exceptional width of 51 feet.

The baked brick revetment of the town-wall adjoining the south-eastern end of the salient survived to a height of thirty-two courses (vertically 7½ feet) and was battered back to an angle of 31 degrees (fig. 3). The south-eastern end of the salient showed two periods of baked brick revetment: (i) a facing 1 foot thick which impinged upon and was therefore structurally later than the revetment of the main wall; and (ii) a subsequent facing 2¼ feet thick. The earlier facing was badly weather-worn at the time of the additional work and had evidently been long exposed.

Cuttings HP XXXI and *XXXV* (pls. XXIII, XXIV, XXV B and XXVI)

These cuttings cover the complex plan of the north-western corner of the citadel. The archaeological problem was here a difficult one. Monsoon rains had driven a deep gulley through the corner and had removed much of the mud-brickwork on the northern side. Builders in search of baked brick had almost completed the work of destruction. Finally, great quantities of rain-wash from the upper contours of the mound covered the site and had been reinforced by extensive spoil-tips from the previous excavations. Nevertheless, the main structural sequence of the complex was sufficiently clear to indicate that this corner, overlooking the storehouses and workshops between the citadel and the river (pl. XVII B), had been elaborately fortified and carefully maintained.

The north-west corner complex revealed two fragmentary structures of baked brick, which underlay the fortification in its present form. The south-western angle of the corner-tower overlapped a short length of wall 3¼ feet wide wall A on plan, pl. XXIV, and near it on the east was a fragmentary baked brick drain which penetrated for about 2 feet under the tower. Its relationship to the rampart hereabouts has not yet been elucidated; the remains are difficult of access but should be further explored. At the north-eastern

angle of the main corner-salient similarly overlapped a fragmentary and indeterminate structure (pl. XXV B), which likewise requires further examination.

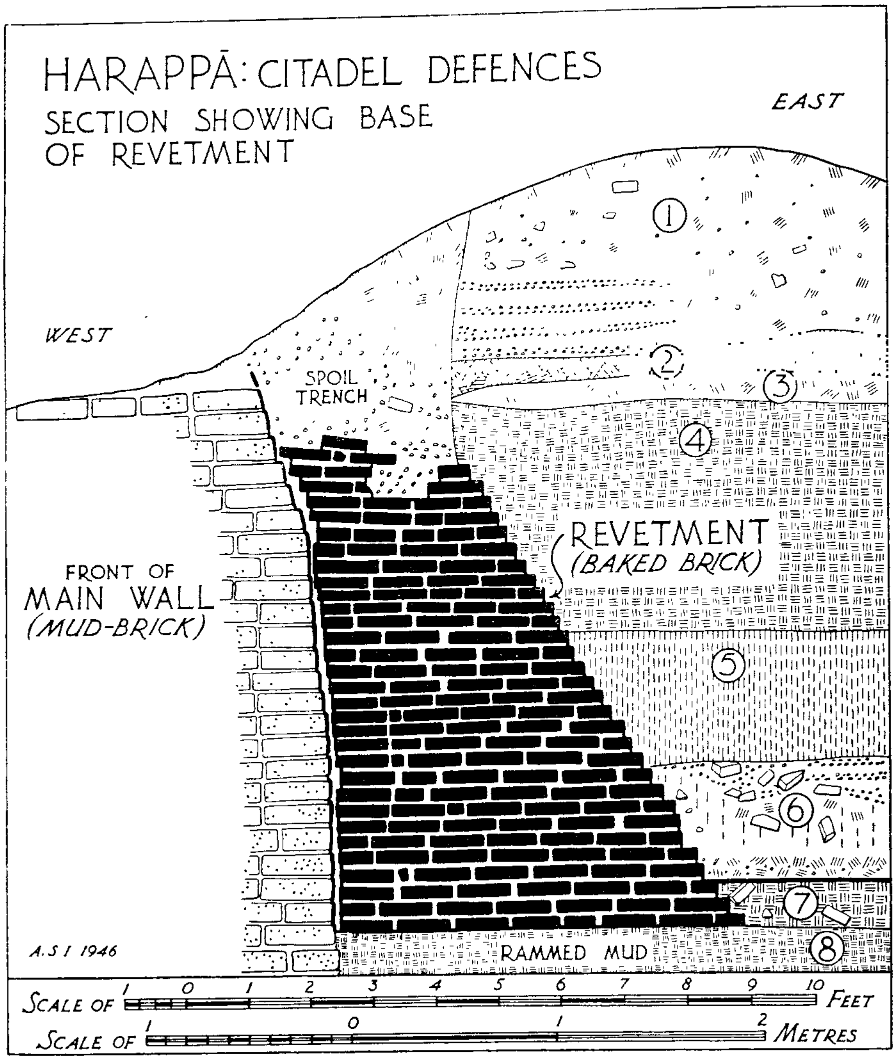
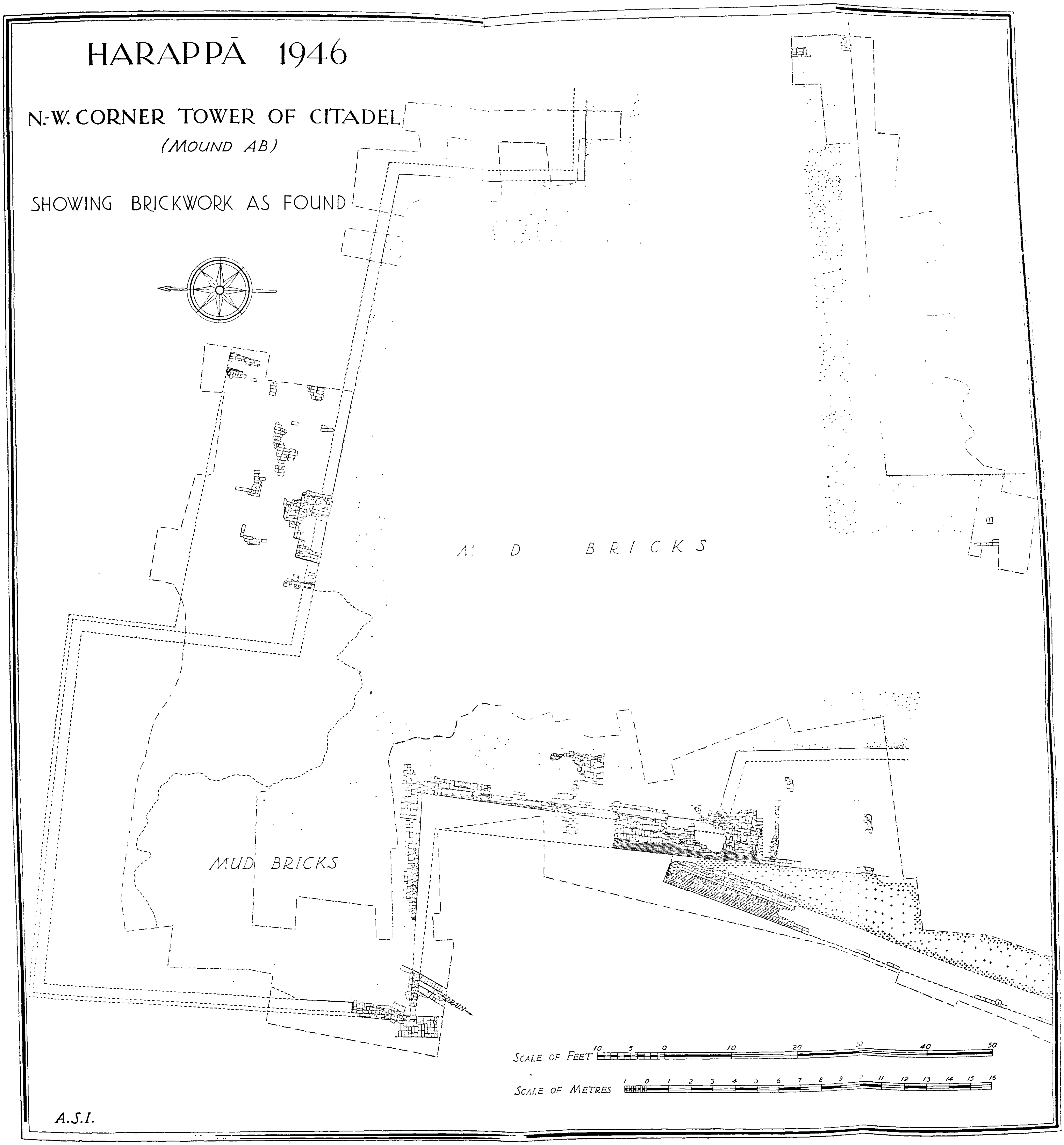


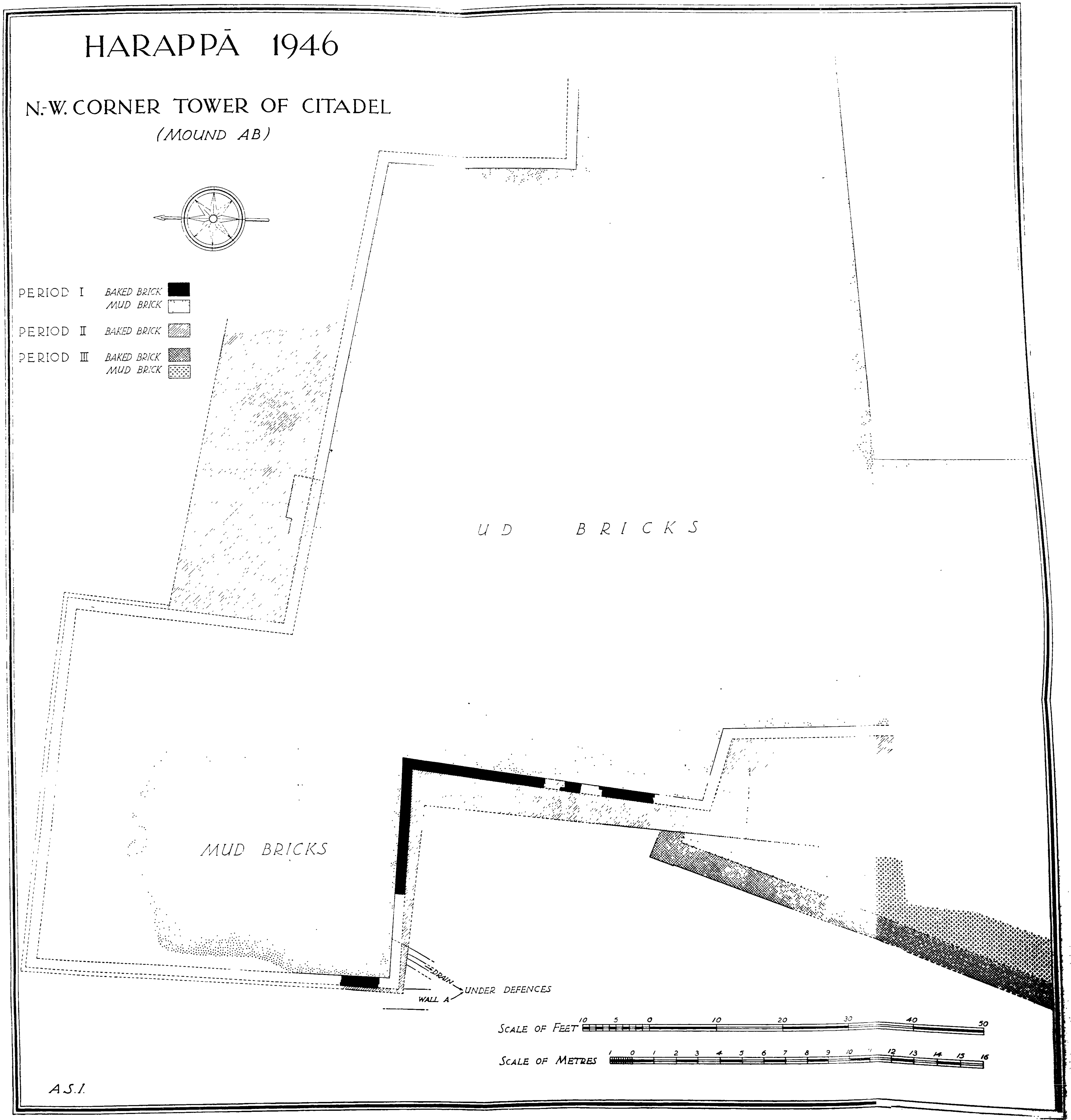
FIG. 3. *Section of revetment of baked bricks in cutting HP XLV*

The fortification itself falls into three clear principal periods, with sub-periods which could not be differentiated in detail on the fragmentary evidence available.

Period I.—The earliest lay-out, as traced, had included a broad salient clasping the corner and culminating in a boldly projecting corner-tower. The mud-brick of salient and tower had been faced with a baked brick revetment $1\frac{1}{2}$ feet thick and battered back at an angle of 27°. This revetment showed signs of extensive exposure and weathering, and at the south-western angle of the corner-tower had collapsed anciently and had been rebuilt in Period II. To the east of the corner the original revetment had disappeared.

Period II.—In this period, the weather-worn revetment of Period I was rebuilt, the new facing having an average width of 4 feet and an angle-of-batter of 26°. To the south the frontage of the former salient was now carried southwards in a continuous line, the former projection from the main mud-brickwall being here filled up with baked brick,


HARAPPĀ 1946
N.-W. CORNER TOWER OF CITADEL
(MOUND AB)
SHOWING BRICKWORK AS FOUND
MUD BRICKS
MUD BRICKS
DRAIN
SCALE OF FEET
10 5 0 10 20 30 40 50
SCALE OF METRES
1 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
A.S.I.


HARAPPĀ 1946
N.-W. CORNER TOWER OF CITADEL
(MOUND AB)
PERIOD I
BAKED BRICK
MUD BRICK
PERIOD II
BAKED BRICK
PERIOD III
BAKED BRICK
MUD BRICK
UD BRICKS
MUD BRICKS
DRAIN
UNDER DEFENCES
WALL A
SCALE OF FEET
SCALE OF METRES
A.S.I.

now fragmentary (pl. XXIV). On the northern side, to the east of the corner-tower, a somewhat similar reinforcement was indicated by surviving scraps of baked brickwork, including a short length of the new outer facing. The brick-filling at this period indicated a structural plan of some complexity and perhaps of more than one sub-period, but the evidence was incomplete.

Period III.—This period is represented by a new tower or salient of mud-brick with a baked brick revetment 3¼ feet wide, having a batter of the exceptional angle of 37°. It will be observed from the plan that this new structure is turned slightly towards the north-east, evidently for the purpose of increasing its command towards the corner. It was traced southwards for a distance of 68 feet, but its southern angle, now covered by high spoil-tips, was not reached. It must, however, have been less than 100 feet.

Cutting HP XXXVI

Cuttings HP XXXVI B, D, C, and A revealed a double projection totalling 20 feet from the face of the main wall. The face of this new salient is then continuous through HP XXXVI main and E–G. The only vestige of the baked brick revetment was in HP XXXVI E, where it was 2 feet wide.

Cuttings HP XXXVII, and XXXIX main and A

These three trenches were cut at the north-east corner, where the mud-brick core of the citadel-wall or of corner-towers today rises imposingly to a height of not less than 35 feet above the surrounding plain. The cuttings revealed mud-brick construction but no actual face, and it was inferred that the latter had been completely eroded leaving only the summit of the underlying rampart. Further search, however, is desirable.

Cuttings HP XLIII A and main, and XXXIII C, E and D

Five trenches were cut to determine the general line of the eastern defences, and disclosed a straight alignment. In HP XXXIII E was a fragment of the baked brick facing, insufficiently preserved to indicate dimensions.

Cuttings HP XXXIII A, F, main, I, J and G

These cuttings were designed to recover the outline of the south-eastern corner, but it was found that a large part of the structure had here been completely eroded on the eastern side. All that remained were the western side and south-western angle of a salient projecting 35 feet from the main face. No traces of the baked brick revetment were disclosed.

Cuttings HP XXXIII H, XLI A and main, and XXVII

From east to west, these trenches indicated the straight alignment of the outer face of the mud-brick wall, a particularly fine example of this being shown in HP XXVII. No traces of the baked brick revetment were found. In HP XXVII, the width of the mud-brick wall was ascertained to be 33 feet 7 inches at the level of the top of the internal platform. In the same cutting, 4 feet outside the mud-brick wall and parallel to it, a baked brick wall 2 feet 10 inches wide, presumably part of an independent extra-mural structure, had been built at a late period on an accumulation of upwards of 8 feet above the base of the former.

Cutting HP XXVII western extension

These cuttings constituted an amplification of the clearance carried out by Mr. M. S. Vats in the centre of the southern side of Mound AB and illustrated in his report by the southern part of his plan, op.cit., II, pl. XXXV. In that plan, and in op. cit., I, 177, he records here an 'infilling of mud bricks' which is now seen to represent a portion of the citadel-wall with a rectangular bastion 33½ feet wide and projecting 12½–16 feet from the main wall (pl. XV). Remnants of a baked brick revetment adhered to the outer face of the bastion. Both in front of and behind the wall and bastion were remains of the underlying mud 'rampart'; and, so far as observation was feasible, all baked brick structures in this area were of subsequent date. Consistently with this, Mr. Vats noted that, at any rate in part, the 'infilling' descended to his Stratum VI, which was the earliest structural stratum identified (op. cit., I, 178). It may be recalled that in the present excavations six building-levels were likewise identified on the platform in section HP XXX.

Cuttings HP XL and XXXVIII

These cuttings at the south-western corner of the citadel revealed two towers or salients, one of which was 43 feet broad with a projection of 16½-17½ feet, while the details of the other had been destroyed by a monsoon-gully. Further exploration is required. In the western angle between the salient and the main wall were remains of the baked brick facing of the latter, and a single course of baked bricks outlined the side of the salient itself.

Cutting HP XLVI

Between the south-western corner and Cutting XXX was a central bastion or salient 53 feet broad and with a projection of 21–25½ feet. At this bastion the wall changed direction, and the intervening trenches verified its course. At both inner angles of the bastion were remains of the baked-brick revetment; that in the northern angle faced the main wall and was 2¼ feet wide, whilst that in the southern angle was a fragment of the facing of the bastion itself.

(*d*) The West Gates and Terraces, and buildings of the 'Cemetery H' culture

The discovery of the defences of the citadel naturally raised the problem of its gateways. At present the question can be answered only in fragmentary fashion. Cunningham observed 'flights of steps on both the eastern and western faces of the high mound to the north-west',[1] but his record is too vague for use, although steps would constitute an intelligible mode of approach to the high platform on which the buildings of the citadel are now known to have stood. In the northern end of the mound the vestiges of the mud-brick defensive wall turn inwards to a marked extent, as though to flank a long ramp or staircase, and the same feature is observable at Mohenjo-daro (above, p. 64). It may be that the large drain which runs eastward towards the defences from 'area I and II' of the old excavations on the Harappā mound passed out through a gate a little south of the centre of that side. But this is not a necessary inference; near the south-eastern corner of the Mohenjo-daro citadel a similar drain emerges through the mud-bricks of the citadel-wall at a point where no gate existed.

In this uncertainty a bid was made to discover and plan a gate on the western side of the Harappā citadel, at a point where a curved re-entrant in the line of the defences suggested

[1] *Archaeological Survey of India Report*, V (1872-3), 106.

To face page 70

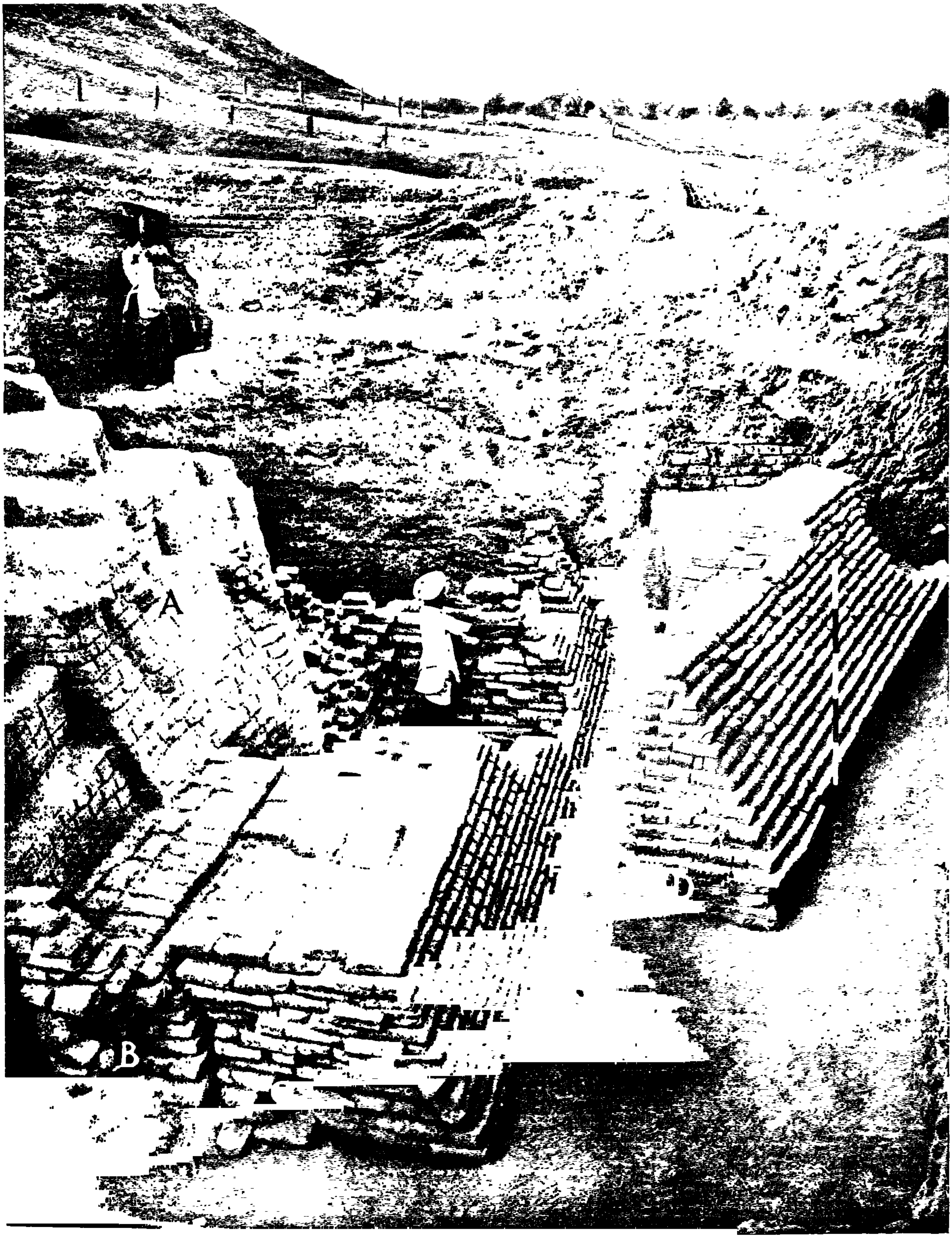
PLATE XXV



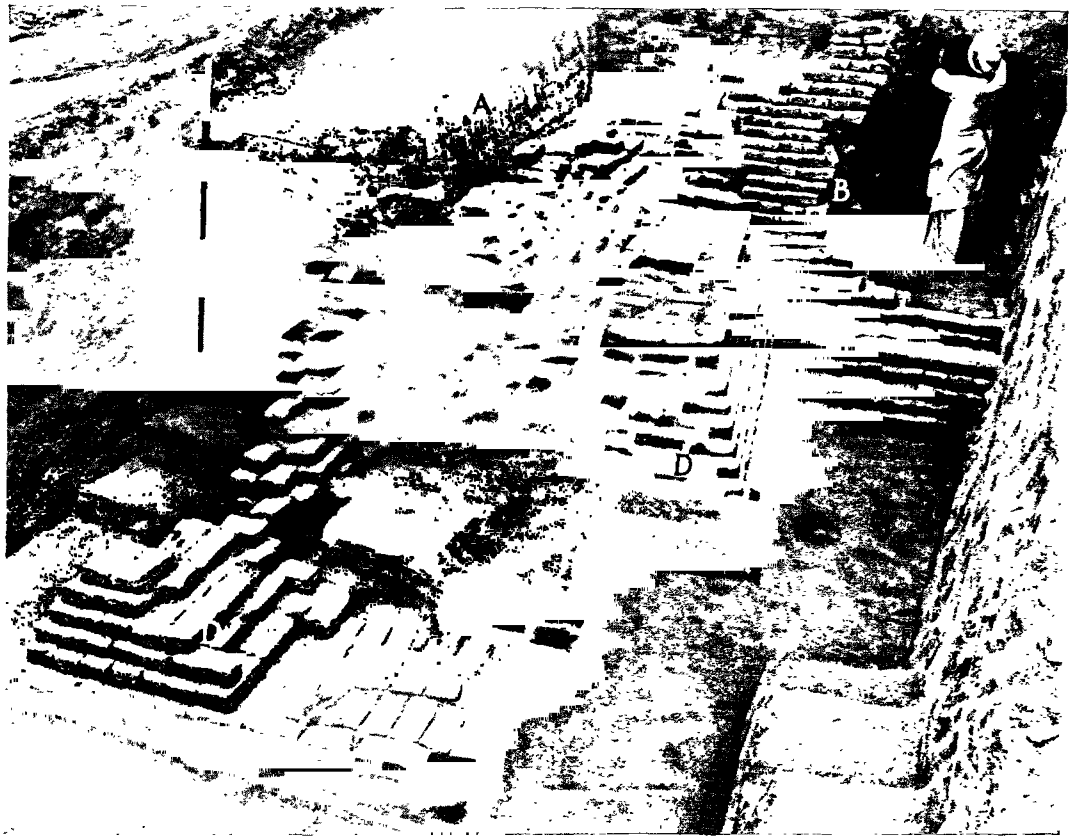
A. *Cutting HP XXX during excavation, from the west. In the foreground, the baked brick revetment of mud-brick defensive wall, the back of which is marked by the figure.*



B *Cutting HP XXXV, north side of citadel, showing the mud-brick defensive wall overriding an earlier baked brick structure*



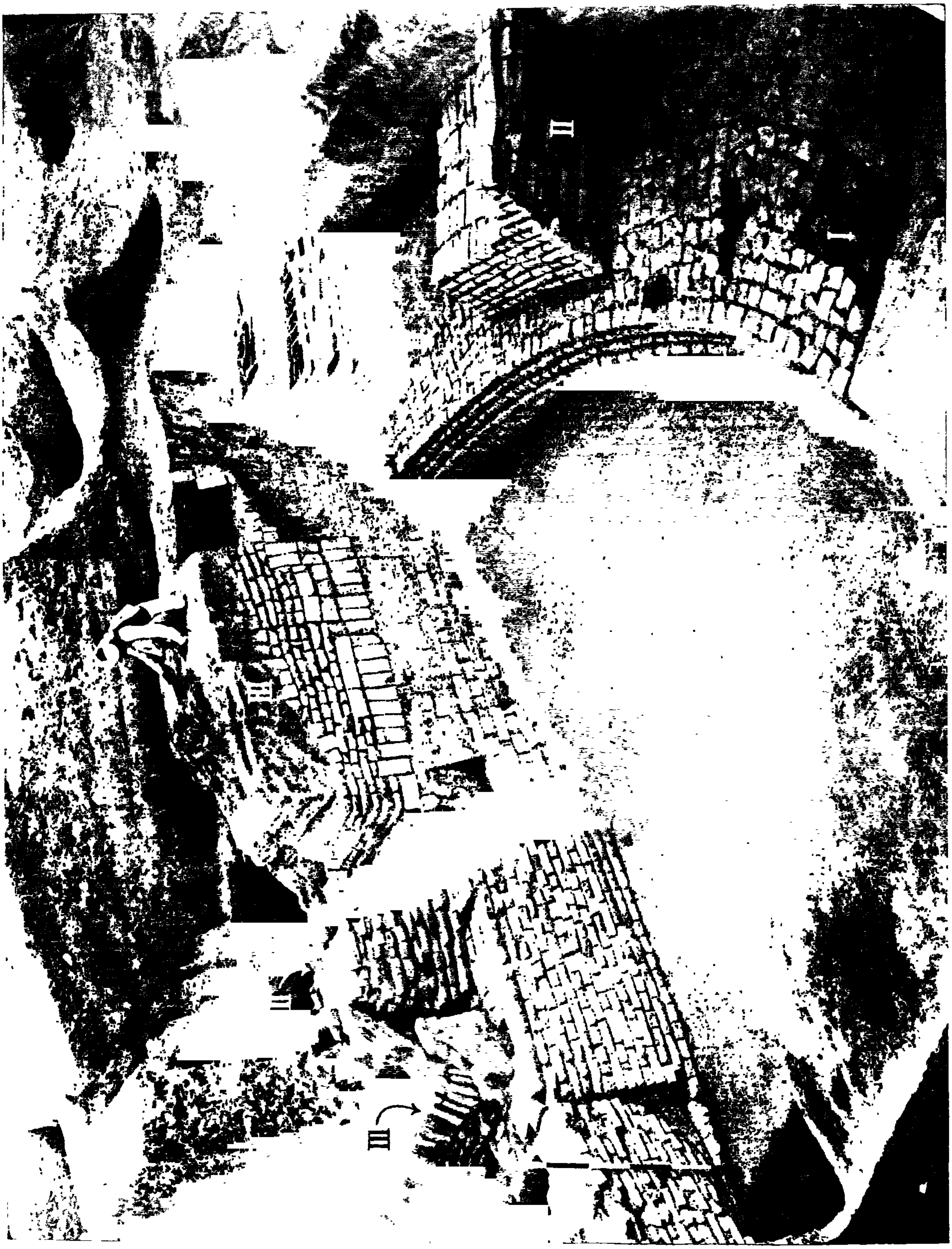
The defences near the north-west corner of the citadel, showing: A, the mud-brick defensive wall; B, C and D, successive phases of baked brick revetment



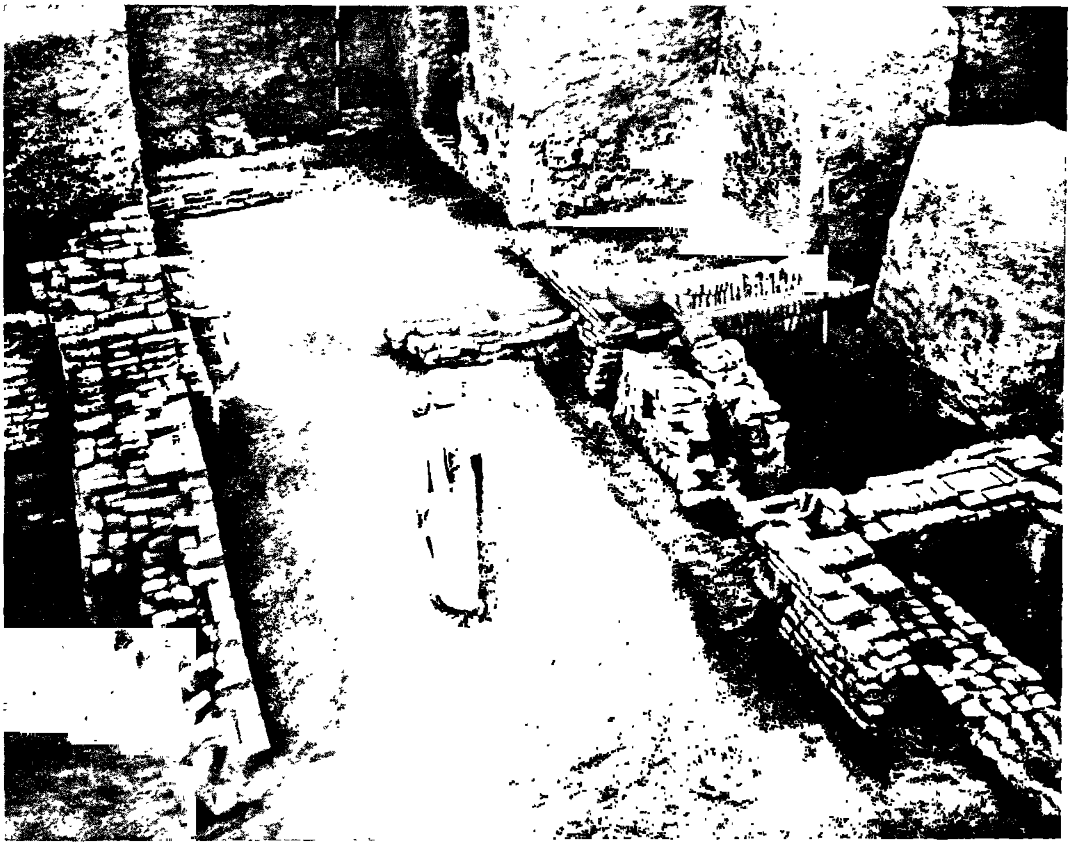
A. *Cutting XLV, on west side of citadel, showing south angle of 'north salient' (plan, pl. XV): A, mud-brick defensive wall; B, baked brick revetment of A; C, Period I revetment of tower or salient; DD, Period II revetment of same*



B. *Cemetery H, Stratum I, burial 11 (sawn into halves for extraction of bones)*
(Scale of inches)



Gateway C, inner side, showing walls of Period I, reconstruction of Period II, and blocking of Period III



A. *Gateway B, from the west; fragmentary baked brick revetment of the main defensive wall in background*

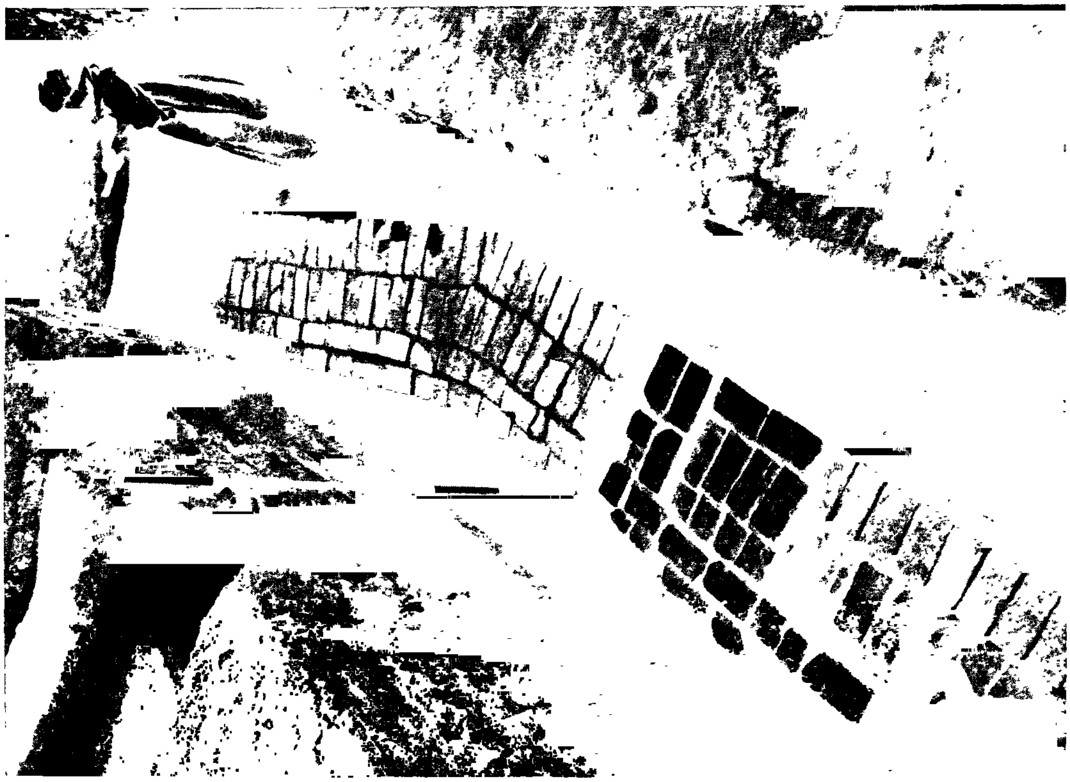


B. *Gateway B: A, wall of Period I guardroom; B, wall of Period II guardroom; C, Period II drain opening upon the gateway; D, Period II steps; E, Period III drain*

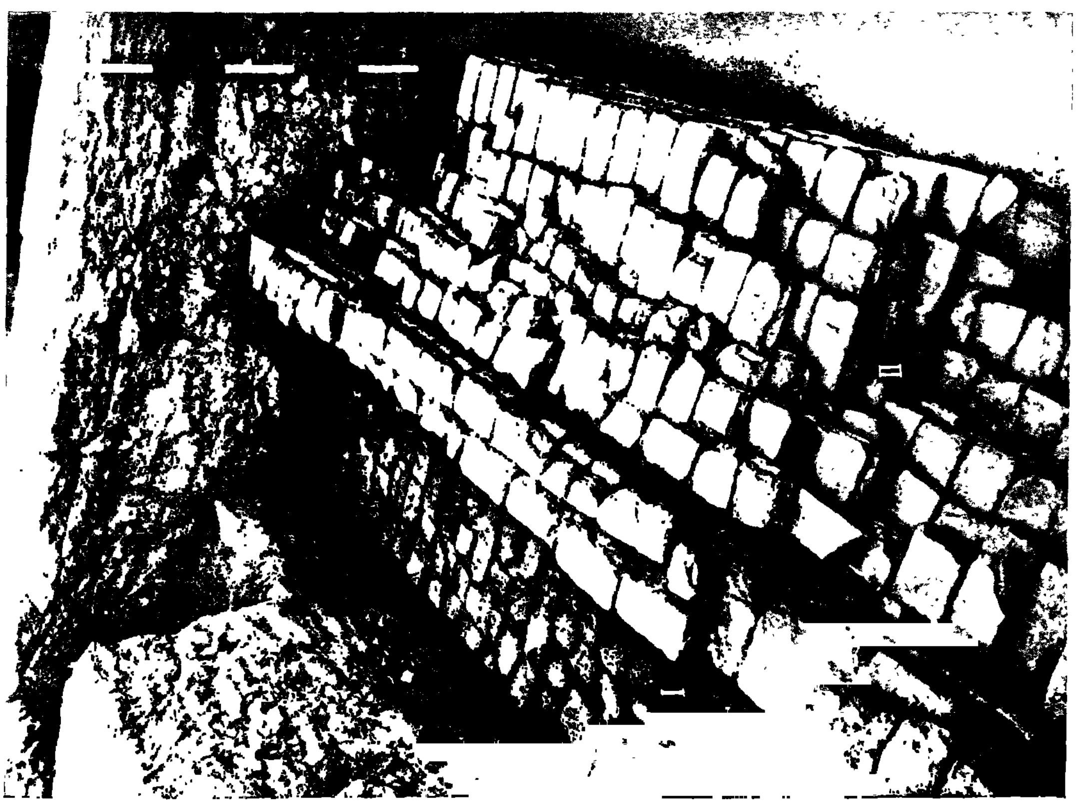
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A. *The baked brick revetment of the main defensive wall outside Gateway C. Below, Period I; above, Period II; behind, mud-brick wall.*



B. *Western terraces: 'fender' wall with drain, Period IA*

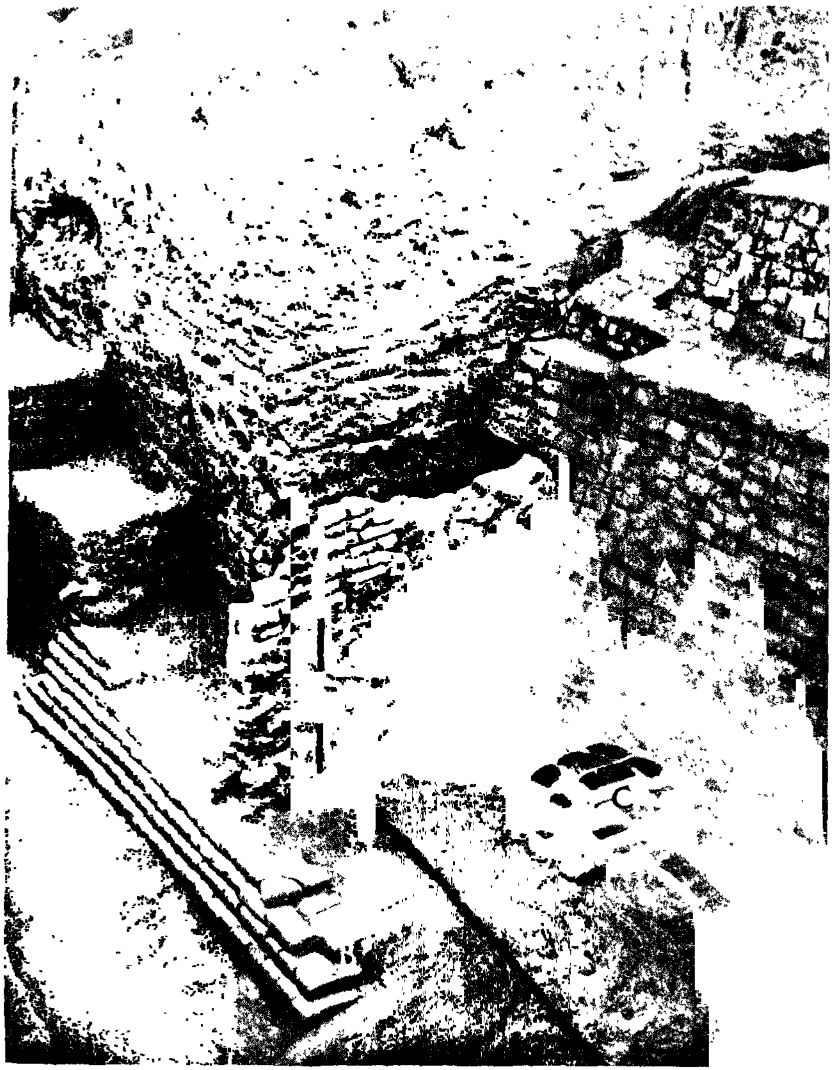


A. *Western terraces: retaining walls of Periods I and II*



B. *Baked brick revetment of main defensive wall in the western 'processional way' (plan, pl. XXXIII): showing, below, weather-worn brickwork of Period I; and, above, little-worn brickwork of Period II*

To face page 71



A. *A, main mud-brick defensive wall beside the western terraces; B, baked brick revetment of Period I; C, remains of baked brick revetment of Period II; D, wall of 'Cemetery H' period, over débris*



B. *Wall of 'Cemetery H' period built on débris overlying the Period I revetment of the main defensive wall adjoining the western terraces*

the likelihood of an entrance. A gate was in fact discovered there, but, having said that, I pass from the anticipated to the unforeseen. (Pl. XXXIII.)

It should be premised that the internal platform, 15–20 feet high, of the citadel implies an approach in the form of a ramp or flight of steps from the outside level. But since the upper part and, in particular, the outer part of the mud-brick defensive wall has long vanished, this further implies that the whole or most of the main entrance has also disappeared. And what nature might have allowed to survive man has systematically destroyed. Relatively modern depredation had reduced the whole area to a shambles such as I have never before encountered on any ancient site—the ground had been ransacked for bricks almost from end to end and top to bottom. Nevertheless, patient and extensive excavation revealed the probable site of the main entrance—A on plan, pl. XXXIII—at a point where the mud-brick structure of the defensive system was interrupted by a rising passage between lateral walls of mixed mud-brick and baked brick. If, as appears likely, this was in fact the site of the main western gate, only the substructure of it remains. Between the flanking walls a filling of mud, with at one place a transverse mud-brick retaining wall, may be presumed to have carried the ramp or stair. At two points, fragments of baked brick walling are possible relics of the flanking superficial structures.

The remainder of the extensive structural approaches to the entrance is less in doubt. It is both complex and remarkable, and, in the absence of better-preserved analogies, may for the present be recorded rather than explained. In essence it consisted of a terrace or terraces fronting the main defensive wall and approached through two outer portals, B and C. The resulting structures fall into three principal periods to which may be added a fourth represented by irrelevant and fragmentary buildings superimposed on the ruined terraces by the 'Cemetery H' intruders.

Period I.—The plan of the main defensive wall hereabouts includes a tower or salient, the front of which was originally somewhat oblique to the main line, as is indicated by the inclination of a baked brick 'fender' wall which fronted it. This 'fender' was pierced near each end by a drain marking the approximate former limits of the salient. Between it and the structure of the salient was a contemporary filling of rammed mud.

In the first phase of this period (IA), the main entrance was approached directly from the exterior, without intervening terrace; the low level of the drains through the 'fender' wall is inconsistent with the co-eval existence of the latter feature. (Pl. XXX B.)

Later, but within the general limits of the same early period, the sloping foreground of the defences was terraced in two closely succeeding phases (IB and IC) to a height of more than 4 feet (see section, fig. 4), the terrace being retained by a wall of baked and unbaked brick at an average distance of 28 feet from the main wall (pl. XXXI A). The level of this terrace rises towards the south to a height of upwards of 8 feet in the vicinity of Entrance A, where it presumably debouched upon and was continued by the ramp or staircase of the gateway. The terrace was strengthened or subdivided in phase IB by an intermediate wall roughly built of baked bricks, and was subsequently subdivided in phase IC, at any rate in part, by a further baked brick wall, now fragmentary.

The terrace was approached by two outer portals, B and C, the former facing west and the latter facing north-east on to the re-entrant already referred to (p. 70). Entrance B at this period consisted of featureless parallel walls, now incomplete at the outer end (pl. XXIX A). Entrance C is of more interest (pl. XXVIII and fig. 5). Its eastern side is formed by the curving revetment of the main defensive wall, and its western by a massive pylon from which runs the outer revetment of an astonishingly long entrance-passage. The latter follows the line of the main wall, turning with it sharply towards the south and ultimately joining the passage from Entrance B. At the angle it is reinforced by a projecting

HARAPPĀ 1946: THE WESTERN TERRACE-SYSTEM
(SECTION C-D ON PLAN)

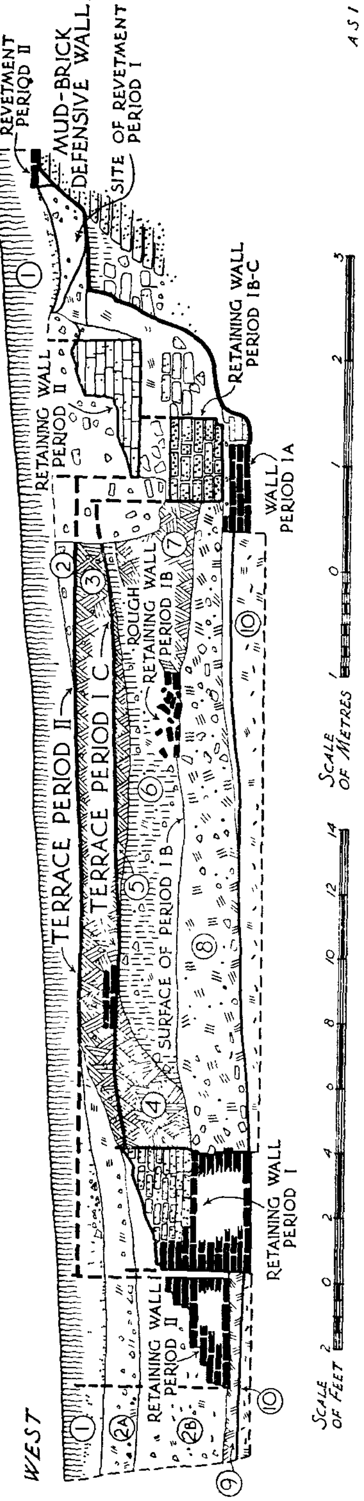


FIG. 4

rectangular guardroom. Probable remains of a second guardroom are ill-preserved at the southern angle of Entrance B (pl. XXIX B).

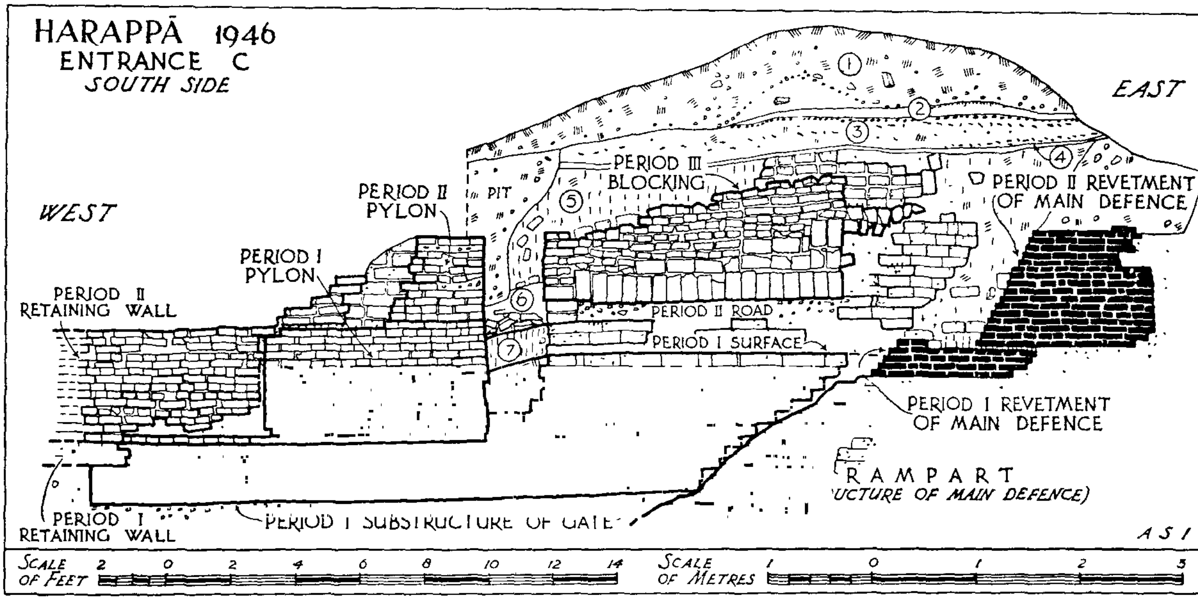


FIG. 5

Both the position of Entrance C and its long, approximately level passageway beneath the sheer wall of the defences are equally remarkable. A natural supposition, explaining both the gate and the re-entrant on to which it opens, would be the former presence of some important building close outside the defences here. A deep trench in the middle of the re-entrant, however, failed to reveal any structure except an insignificant oblong brick base of uncertain period beside the main wall (pl. XXXIII). A more convincing explanation therefore is that the re-entrant constituted an assembly-area, out of sight of the main terraces, to which the long passage from Entrance C formed a ceremonial approach (see below, p. 74).

Period II.—In this, the mature phase of the Harappan civilization,[1] the gates and terraces were rebuilt on a similar plan but in more substantial and elaborate fashion. It is evident that the walls of Period I had been long exposed (pl. XXXI B), and at Entrance B a burnt layer and burnt bricks suggest but do not prove a violent destruction. A conditioning factor of the work of this period is a general rise of the ground-level. The main defensive wall was almost entirely refaced with baked brick, the new foundations being up to 2 feet above the old. At the same time the terrace between Entrances A and B was re-walled front and back, the back wall being mostly of mud-brick but partly of baked brick, the latter including a drain. Further, the front of the tower or salient was trimmed

[1] It may be observed that, whilst the brickwork of Period I is inclined to be sketchy, with a predominant use of broken bricks, in Period II complete bricks are normal even for the core of a wall. See pl. XXVIII. In Period III there is a marked deterioration of the brickwork.

back to its present asymmetrical plan. Between the terraces, immediately south of Entrance B, a flight of steps with brick-on-edge treads was added shortly afterwards; two of the steps survive.

Entrance B was likewise rebuilt, largely on the old plan, but with the addition of two niches or wall-seats, respectively in the northern wall and the neighbouring passage from Entrance C. The new southern wall included a drain, and in the south-western angle was a guardroom to which access was obtained through an adjacent doorway of which the door-sockets and part of the worn sill of bricks set on edge remained.

Entrance C was similarly remodelled, both flanking walls being completely rebuilt at the higher level. The pylon of Period I was now in a semi-ruined condition, but its nucleus was adapted to the new work. The accumulation of road-surfaces is illustrated in fig. 6.

Period III.—In this period Entrance B was partially blocked by a screen-wall with a reduced entrance in the middle. Entrance C on the other hand was now entirely blocked by a barrier of baked and unbaked brick (pl. XXVIII). The brick-construction of this period is very much rougher than that of either of the two preceding periods. It is evident that Harappā was at this time on the decline and, it would appear, on the defensive.


Period IV followed after an interval during which the structures relating to the terraces had fallen into decay and had been covered by débris (pl. XXXII). It is represented by fragments of poorly constructed buildings, presumably dwellings, with walls sometimes only one brick in thickness. The interest of these structures lies in the facts that they are associated with pottery of the 'Cemetery H' industry (p. 98) and that they clearly post-date the citadel as a disciplined and effective unit. Two drains, built on the surviving summit of the steps beside Entrance B, probably belong to this period.

* * * * * *

If any inference from the plan of periods I–III may be ventured at present, it is this: the general lay-out, with its terraces and its remote northern outer gate opening upon the curious re-entrant in the citadel-wall, is not explained by the normal needs of defence. On the other hand, a deep trench in the centre of the re-entrant has failed to reveal any structure there to which the northern gate could supply private access, and, though the search has not been exhaustive, it is unlikely that any major building occupied the site. We are driven back upon the conclusion that the plan was designed to conform with the needs of some sort of ceremony—religious or secular or both—in which the terrace or terraces played a dominant rôle, and to which processional access was required. On the assumption that the terrace-frontage was the focus, a procession could well muster out of sight in the re-entrant round the corner of the defences, and could then proceed up the long and devious passage to the main scene. A variety of processional ceremonies to which the scheme could be adapted suggests itself, but choice is unprofitable until we have more knowledge of Harappan religion and administration.

3. SOCIOLOGICAL ASPECTS OF THE HARAPPĀ CIVILIZATION

Documentary and archaeological evidence has familiarized us with the general structure of society in Egypt and the Middle East during the third millennium B.C. Based economically upon the produce and traffic of great river-plains, the kingdoms or city-states of those regions had an essential affinity with the contemporary cities of the Indus system. It would be but natural to find that this similarity of supply and opportunity, combined with a roughly analogous equipment, produced in India a social organization not altogether unlike those of the contemporary West.


HARAPPĀ 1946: WESTERN GATEWAYS AND TERRACES
SCALE OF FEET
SCALE OF METRES
HEIGHTS IN FEET ABOVE SEA-LEVEL
PERIOD IA
BAKED BRICK
MUD BRICK
PERIOD IB
BAKED BRICK
PERIOD II
BAKED BRICK
MUD BRICK
PERIOD III
BAKED BRICK
MUD BRICK
"CEMETERY H" PERIOD
BAKED BRICK
MAIN DEFENSIVE WALL (MUD-BRICK)
EARLY BASE
GATEWAY C
BLOCKING
PYLON
SECTION
N SALIENT
S SALIENT
PROCESSIONAL WAY
GUARD-ROOM
RECESS
DRAINS
RAMP
GATEWAY B
TERRACES
RAMP OF STAIR
REVETTED PROJECTION
GATEWAY A
SARAN

HARAPPĀ: WESTERN GATE-SYSTEM, SECTION ACROSS ROADS INSIDE ENTRANCE C (SECTION A-B ON PLAN)

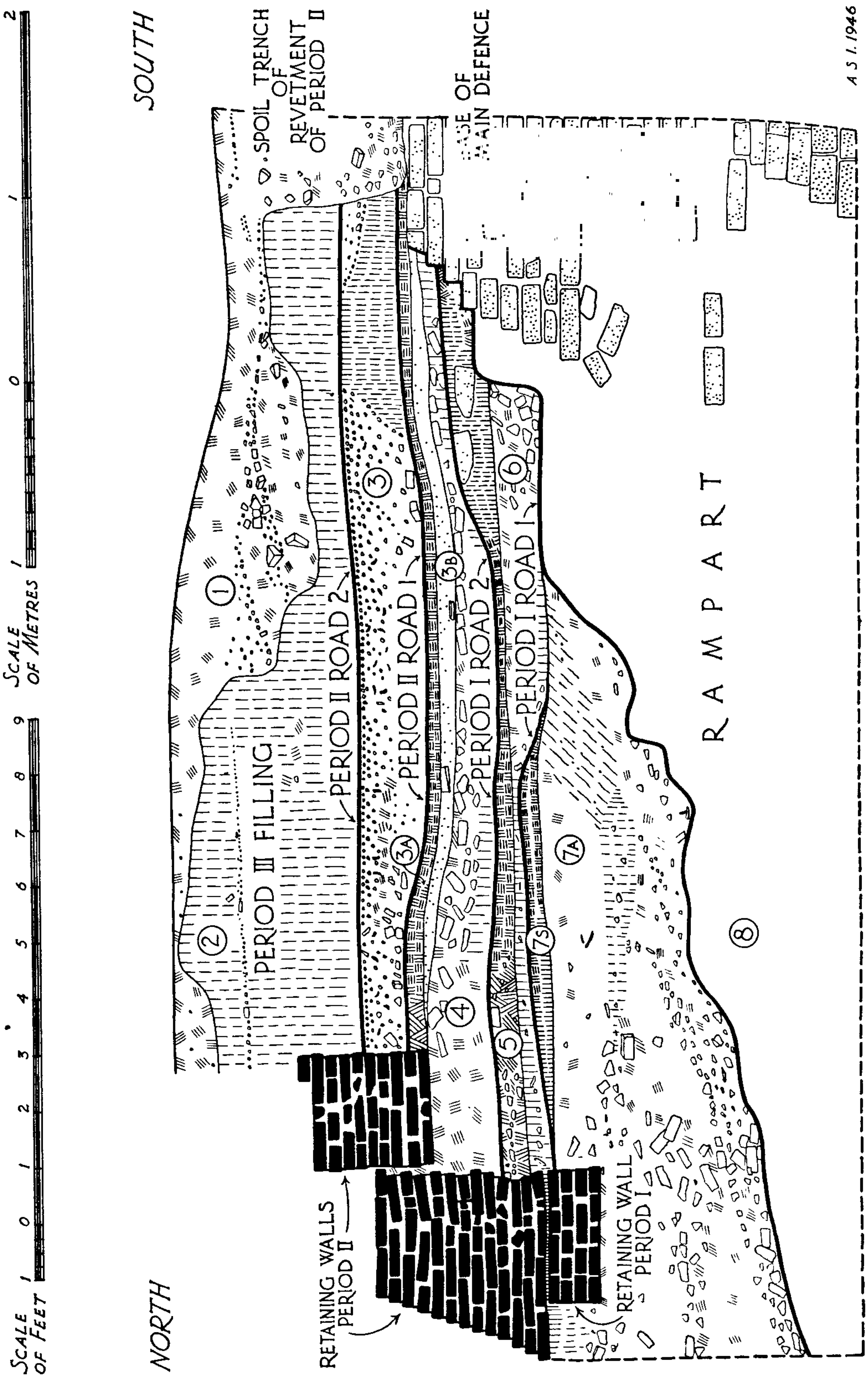


FIG. 6

And this, as we now begin to see more clearly than before, was actually the case. In Sumer, the wealth and discipline of the city-state were vested in the chief deity, i.e. in the priesthood or a priest-king. The civic focus was the exalted temple, centre of an elaborate and carefully ordered secular administration under divine sanction. About it were granaries and workshops, bakeries and breweries, manned by servile and semi-servile workers whose wage-lists or ration-lists are preserved to us. Thus in the temple of Baü at Lagash were twenty-one bakers with twenty-seven female slaves, twenty-five brewers with six slaves, female wool-preparers, spinners and weavers, a male smith and other artisans and officials. Similarly, a cloth-factory employing ninety-eight women and sixty-three children was situated within the enclosure of the temple of the Moon God Nannar at Ur, and came within the administration of the city and the temple. Such cities were massively fortified, and the enwalled temple-tower arose as a sort of acropolis or citadel in their midst, symbol and stronghold of undivided religious and secular authority. In essence, the picture is one of a rigid and highly-evolved bureaucratic machine, capable of organizing and distributing surplus wealth and of defending it, but little conducive to the political liberty of the individual.[1]

To this picture Harappā, amplified by Mohenjo-daro, begins to assume a significantly similar outline. The relatively small detached mound AB, highest on the site, stands aloof and heavily fortified, its defences carefully maintained. If its buildings, now pitifully wrecked, possessed anything of the distinction of those on the closely equivalent mound at Mohenjo-daro (above, p. 62), it was marked by more than its defences. In its shadow, on the low ground between it and the former course of the river, lay blocks of barracks or cooly-quarters, serried lines of circular working-platforms, furnaces, and a notable series of store-houses, protected doubtless by a river-embankment or bund of which possible traces still exist.[2] The whole group (pl. XV) is marshalled like a military cantonment and bespeaks authority. The cooly-quarters are notable for their uniformity and, incidentally, for their oblique entrances, designed to secure privacy. The store-houses, with raised and ventilated floors, represent a type of granary familiar in many remote places and periods. They here stand in orderly array on a carefully-built podium with a battered retaining-wall of burnt brick, similar to that which revets the defences of the citadel. The intervening circular platforms, of which twenty have been exposed, are now shown (below, p. 78) to have framed wooden mortars in which grain was pounded with wooden pestles as in modern Kashmir.

It can no longer be doubted that, whatever the source of their authority—and a dominant religious element may fairly be assumed—the lords of Harappā administered their city in a fashion not remote from that of the priest-kings or governors of Sumer and Akkad. In other words, the social structure of Harappā conformed in principle with that of the other great riverine civilizations of the day. That was to be expected but has not hitherto been shown. And further evidence is probably not far to seek. The fragmentary Kushāṇa stūpa on the stūpa mound of Mohenjo-daro has long fulfilled its purpose and can tell us nothing new; time, if no other agency, will shortly complete its destruction, and the way will then be clear for the examination of the underlying platform and the dominant building which it is known to carry. At Harappā the careful transference of a few village forefathers from the summit of mound AB would release the equivalent area for excavation. So far, no temple of the Harappan civilization has been recognized; on these two spots,

[1] For a summary of the system, see V. Gordon Childe, *What happened in History* (London, 1942), pp. 82ff., and *Man makes himself* (London, 1936), pp. 173ff.

[2] Similarly at Mohenjo-daro the nearest branch of the Indus is flanked on the side of the city by the fragments of an ancient embankment formerly at least a mile long. The embankment incorporates 'Harappan' material.

the crowning heights of the two citadels, we may expect to find, if anywhere, the godhead or fixed centre round which, on the analogy of Sumer, the unchanging civilization of the Indus slowly revolved.

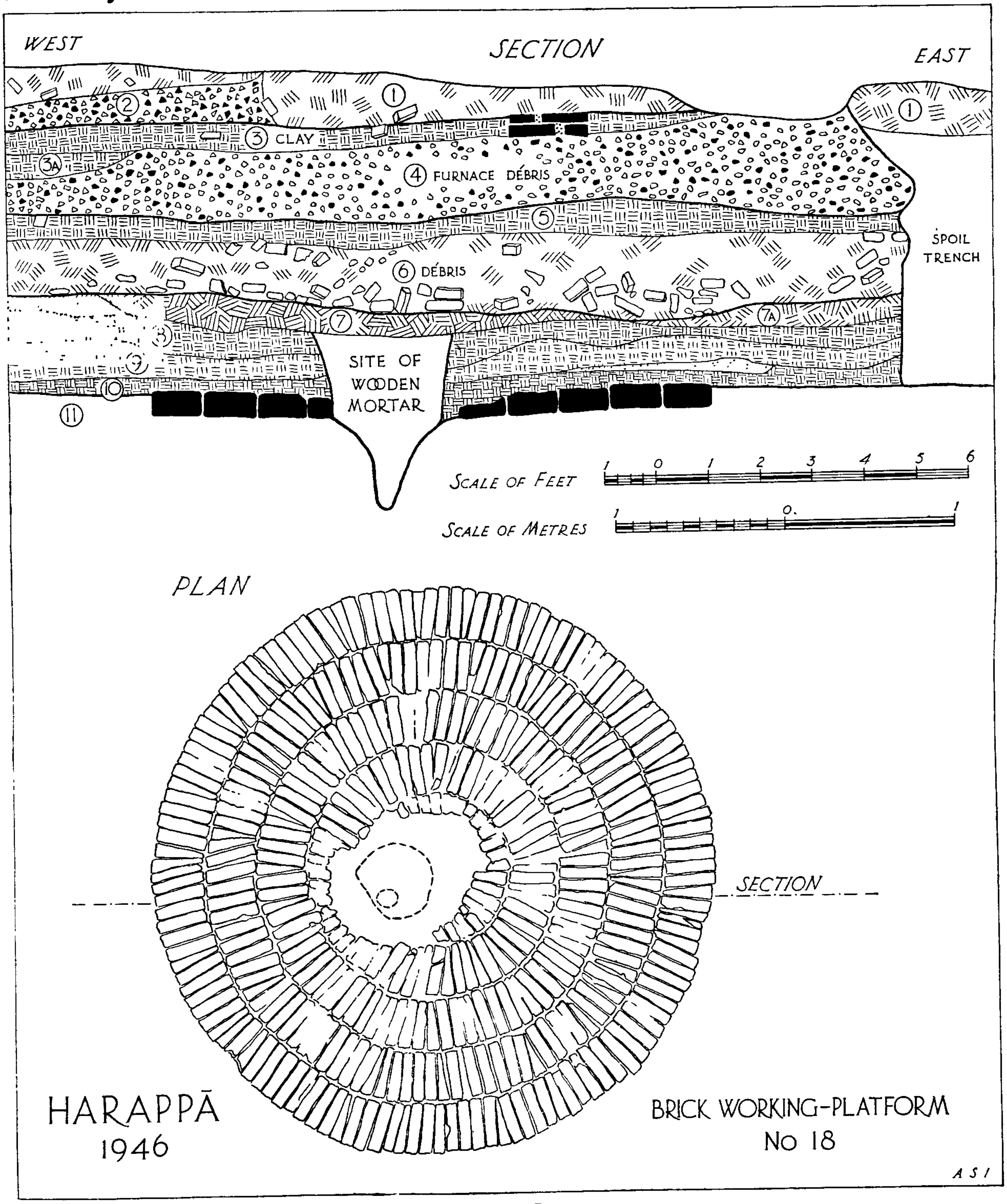


FIG. 7

Appendix A: The circular working-platforms of Harappā

In view of the uncertainty as to the use of the circular brick platforms situated between the 'cooly-quarters' and the granaries to the north of the citadel, and to the unfortunate fact that most of the nineteen previously discovered are fragmentary or have been rebuilt with modern bricks and so deprived of evidential value, an additional example was carefully uncovered in 1946. (See fig. 7 and pl. XXXIV.)

The newly excavated platform is circular in shape, with a diameter of 10 feet 9 inches to 11 feet. It consists of five concentric rings of burnt bricks set on edge, and is one brick in thickness. The ring nearest to the centre has been extremely worn and broken, that next to it somewhat less so, whilst the outermost ring is the least worn. The central void was carried down below the brick-course as a conical hollow to a depth of 2 feet 4 inches, and was continued upwards in section to a height of 1¼ feet by a cavity filled with loose earth in the make-up of an overlying floor. It was evident that a wooden object had been embedded in the socket and had projected above the brick-platform; and it may reasonably be inferred that a wooden mortar, hollowed in a section of a tree-trunk, occupied the centre of the platform. The fragmentary character of the innermost ring of bricks suggests that they may have been inserted in an incomplete state as wedges, or their damage may have been due in part to renewals of the wooden mortar. In the first and second rings from the centre—more clearly in the second—a group of two or three hollow-worn bricks alternates with a group of one or two relatively sound bricks, the former, it may be supposed, representing the place where the feet of the workman were normally planted. About the broken centre were found fragments of straw or husk.[1]

It is inferred, therefore, that the platform surrounded a wooden mortar where grain was pounded by one or more workers with long pestles.

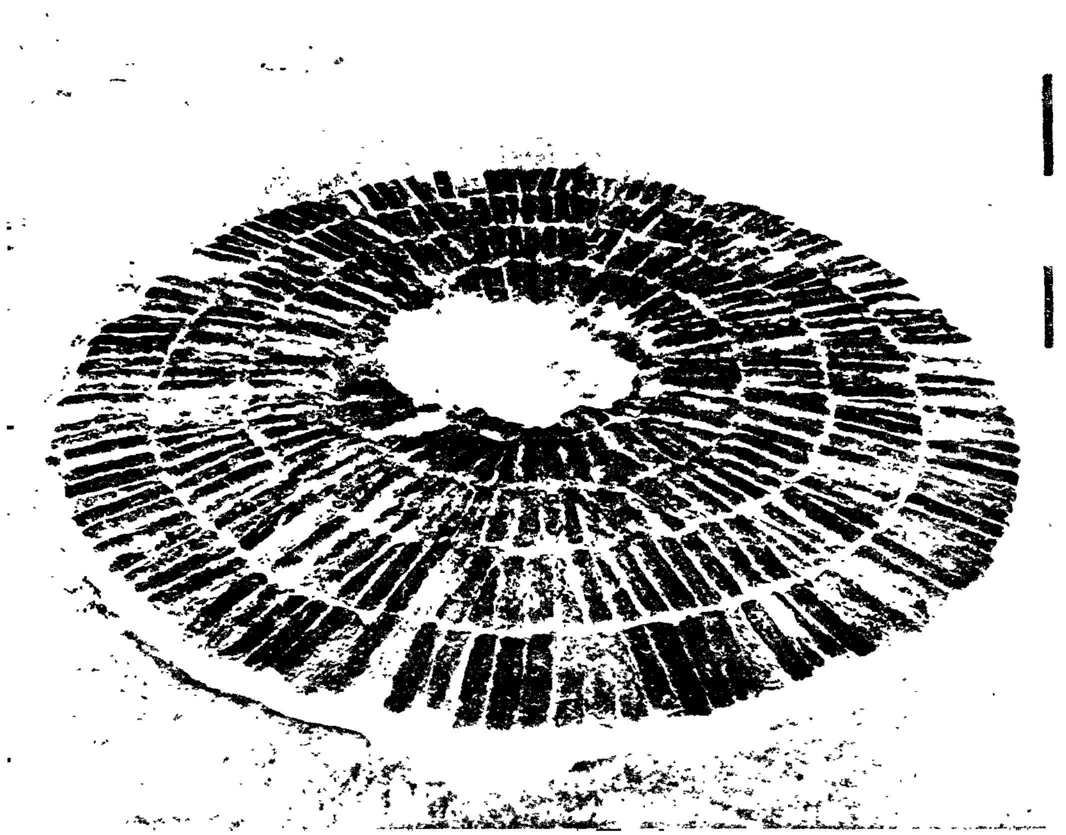
A similar pounding-system is in vogue at present in several parts of India; e.g. in Bengal and other eastern provinces, and in Kashmir. The mortar is either of wood or of stone; it is sometimes wedged on a pedestal and sometimes stands freely on the ground. The grain is usually pounded by two men (or women) using pestles about 5 feet long in alternation (pl. XXXV A). Wooden mortars used in the Punjab and elsewhere for pounding mustard-seed are fixed in the earth in similar fashion to that implied by the Harappā evidence, and the pestle is rotated by a circumambulating bullock.

4. HARAPPAN CHRONOLOGY AND THE ṚIGVEDA

The fixed point in the chronology of the Harappā culture is that, in a characteristic phase, it was in contact with Sumer in and about the time of Sargon of Agade (Akkad), now dated to *c.* 2350 B.C.[2] The evidence consists primarily, though by no means exclusively, of seven (or possibly eight) seals of Indian origin or type found at Ur (1 or 2), Kish (2), Tell Asmar (2), Tepe Gawra (1) and Susa (1) in associations certainly or probably of Sargonid date. Unfortunately no type-sequence of the seals of the Harappā civilization has yet been detected, and in any case four at least of the seven in question are of types which appear to occur at all the excavated levels of Mohenjo-daro. Of the other three, one from Tell Asmar is a cylinder which, though clearly of Indian workmanship, is not closely comparable with any of the three cylinder-seals found actually at Mohenjo-daro; and the fact that the latter were recovered respectively at 5·9 feet, 11·8 feet and 14·5 feet below datum means—if it means anything at all—that the cylinder was there almost equally long-lived. The square seals incised with concentric squares from Tell Asmar and Tepe

[1] Burnt wheat and husked barley were found in the central hollow of one of these platforms during the previous excavations (Vats, I, 74).

[2] The evidence of contact, based upon C. J. Gadd, 'Seals of ancient Indian style found at Ur', *Proc. Brit. Academy*, XVIII (1932), has recently been reviewed by S. Piggott in *Antiquity*, XVII (1943), 178ff., and in *Ancient India*, No. 1 (1946), p. 21. The shortened dating of Hammurabi (1792–1750 B.C.—Sidney Smith, *Alalakh and Chronology*) is vital to the argument which follows, and, in the deficiency of the necessary apparatus in India, I am indebted to Professor Gordon Childe for correspondence regarding the application of this dating to the earlier periods of Mesopotamian chronology.

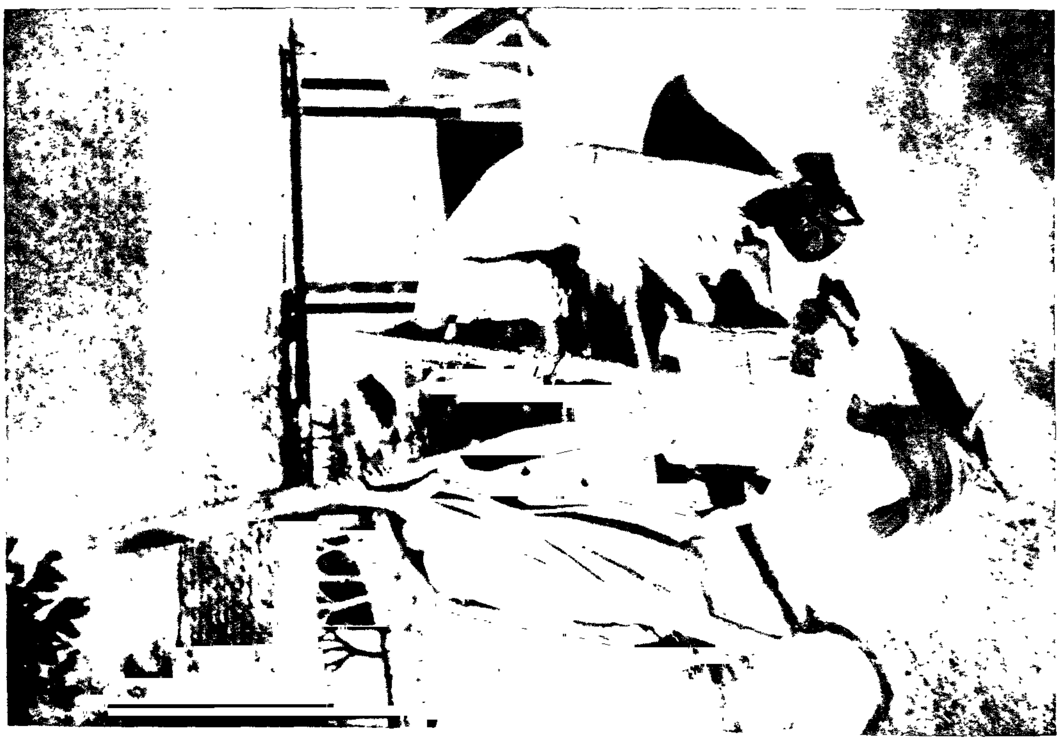


A. *Working-platform of baked brick, excavated in 1946*



B. *Baked brick working-platform during excavation, 1946, showing at A the socket of the former wooden mortar*

To face page 79



A. *Pounding rice in a wooden mortar near Srinagar, Kashmir*



B. *Early cart-track beneath Cemetery H*

Gawra are comparable only with a rare Mohenjo-daro type of which little is known. In other words, the Akkadian 'fixed point' is a very mobile one in so far as the internal chronology of the Harappan civilization is concerned. Its significance is limited to the indication—an important one, so far as it goes—that in the period of Sargon the Harappans were in livelier contact with the West than at any other time.[1]

There is indeed other seal-evidence which might be expected to bracket the Sargonid series and so add a little definition to the picture. Two Indo-Sumerian seals have been ascribed to the pre-Akkadian period, both from Ur. One, only vaguely Indian, is dated as pre-Akkadian by reason of the archaic cuneiform inscription which it bears; the other was found in the filling of a tomb-shaft ascribed by Woolley to the elusive Second Dynasty of Ur but by Frankfort to the Akkadian period.[2] Its nearest analogy[3] was found at Mohenjo-daro at a depth of 14·8 feet below datum and presumably therefore occupies an intermediate position in the excavated series. But altogether the 'pre-Akkadian' evidence does not effectively extend our chronology backwards.

At the other end of the bracket, three Indian seals seem to occur in post-Akkadian contexts at Ur (2) and Lagash (1). A crude cylinder-seal from Ur was found in a Larsa tomb which may be dated to the beginning of the second millennium B.C. That the crudity of the workmanship is not in itself evidence of relative date is indicated by the apparently undifferentiated occurrence of good and bad seals at all excavated levels of Mohenjo-daro. The seal from Lagash is said to belong to the same period.[4] Yet another from Ur occurred in 'upper rubbish, Kassite (?) level', which is not satisfactory stratification but *may* indicate a date as late as the sixteenth or fifteenth century B.C. Incidentally, the type is remarkable: it represents a man carrying a yoke wherefrom hang objects which have been interpreted as water-skins or pots. They are more probably fishing-nets, each containing a fish. A similar theme—a man between two nets with star-like objects in the background—is represented on a potsherd from Harappā.[5]

The seals as a whole, therefore, carry us from the eve of the Akkadian period to the beginning of the second millennium, with possible though doubtful intrusion into the middle of that millennium. How far is this indication amplified from other sources?

First, the copper pins. At Chanhu-daro in Sind, Mackay found a double-spiral copper pin allegedly in the Harappā levels. But in spite of the distinctive character of this well-known type, it offers no present aid to our problem. A type which occurs on the one hand in Sialk IV (probably the latter part of the fourth millennium) and on the other hand in the *terramare* of Italy two thousand years later has no chronological significance in this context, until local values are determined independently. A single-spiral copper pin found at Mohenjo-daro at a depth of 18·4 feet below datum and therefore presumably derived from a fairly early phase of the occupation is also a widespread type to which it would be equally perilous to attach importance; and the occurrence of several roll-top pins of

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[1] The evidence of the seals is reinforced by potsherds, etched beads and kidney-shaped inlays of bone, all of Harappan types, found in Akkadian houses at Tell Asmar. See *Oriental Institute of Chicago Communications*, No. 16 (1933), pp. 48ff. Gold and faïence disc-beads with axial tube occur at Mohenjo-daro and Harappā (Marshall, II, 522-3; III, pl. CXLVI, 34, and pl. CXLIX, 7; Vats, II, pl. CXXXIII, 3), in Sumer in Early Dynastic III—Akkadian contexts, and, consistently, in Troy II. The gold examples from Mohenjo-daro were found at a depth of 6 feet with scrap-metal, which suggested a 'goldsmith's hoard of metal for melting'. It is uncertain, therefore, how old they were at the time of burial. For the type, see D. E. McCown, *The Comparative Stratigraphy of Early Iran* (Chicago, 1942), p. 53 and Table I; also V. Gordon Childe, *New Light on the Most Ancient East* (London, 1934), pp. 185, 195, 213.

[2] H. Frankfort, *Cylinder Seals* (London, 1939), p. 306.

[3] Mackay, II, pl. XCVI, No. 500.

[4] *Revue d'Assyriologie*, XXVII, 177.

[5] Vats, II, pl. LXIX, 16.

Hissar IIIB forms in the Jhukar occupation which overlies the Harappā levels at Chanhu-daro has a derivative rather than a contributory interest. The pins in fact do not appreciably help.

Secondly, a copper axe-adze found 6 feet below the surface of Mohenjo-daro is paralleled in Early Minoan II, Troy II, and Hissar III, and lasted into the second millennium B.C. in Europe and perhaps the Caucasus. This therefore adds nothing to the seal-dating.

Thirdly, a more definitive discovery is that of an unpublished bronze or copper knife of distinctively curved Harappan type[1] found by Dr. Erich Schmidt at Hissar in stratum IIIB. The dating of Hissar III is under discussion; McCown's chronology equates Hissar IIIB with Early Dynastic II-III of Ur, but Piggott would make it overlap the Akkadian period.

Fourthly, there are a circular steatite pyxis or box (a fragment probably of the Mesopotamian 'hut' type) found at Mohenjo-daro by Mackay at the considerable depth of 28·1 feet below datum, 'in a very early stratum', and the two rectangular stone boxes found previously by Marshall at depths of only five and seven feet.[2] Similar vessels occur at Ur, Kish, Khafajah and Susa (McCown's D),[3] and, nearer India, on the undated but perhaps late Harappan site of Mehī in southern Baluchistan and elsewhere.[4] In Mesopotamia these boxes seem to be characteristic of Early Dynastic III, but in north-eastern Iran simple examples such as those from the higher levels of Mohenjo-daro occur in Shah Tepe IIA and Hissar IIIC,[5] which are Early Dynastic III—Akkadian on McCown's chronology or late Akkadian (*c.* 2000 B.C.) on Piggott's. Indeed the deep-level 'hut' box from Mohenjo-daro is at present almost the *only* piece of definitive evidence from the Harappan civilization that need go back beyond Sargon.[6]

The more general relationships, direct or indirect, between the Harappan culture and the other Indo-Iranian cultures of the chalcolithic phase do not at present help appreciably to narrow or confirm the absolute dating of the former. They constitute an alluring and important study, and they are engaging the attention of an increasing number of very competent scholars. The first results show abundantly that in these comparative studies the time-factor must not be pressed too hard. The cultures in question were liable to an uncanny durability, particularly in phases or areas of economic equilibrium, and there is ample scope for differential development of a baffling kind from region to region. Mention has been made above of the wide extension of certain metal types in time no less than in space. In pottery a similar, though more surprising, persistence cannot be discounted. Marshall's first impression that there was 'but little difference in style and technique at the various levels' of Mohenjo-daro is modified but not contradicted by Mackay's later results. Mackay's plates show an apparent persistence of distinctive types and techniques (including even the elaborate polychrome decoration) from first to last, associated from time to time

[1] Cf. Vats, II, pl. CXXII, 6. I owe the information as to the Hissar example to the kindness of Dr. Donald McCown.

[2] Mackay, I, 321, and II, pl. CXLII, 45; Marshall, II, 369, and III pl. CXXXI, 37.

[3] Mackay in *Antiquity*, VI (1932), 357; Henry Field, ibid., VII (1933), 84.

[4] Mehī has produced one rectangular and three circular examples in stone and two circular pottery-imitations, all in the Central Asian Antiquities Museum, New Delhi. For other sites, see Piggott in *Antiquity*, XVII (1943), 176.

[5] See McCown, *The Comparative Stratigraphy of Ancient Iran*, fig. 17.

[6] Dr. McCown (in conversation) is inclined to ascribe the oblique cruciform pattern on one of the shell-plaques of the gaming-board from the royal tomb PG 789 at Ur to Harappan influence, comparing the cruciform pattern on a silver ring from Mohenjo-daro. This comparison might add a second contact with Early Dynastic III. See C. L. Woolley, *Ur Excavations, Vol. II, The Royal Cemetery*, p. 277 and pl. 96; Marshall, *Mohenjo-daro*, etc., II, 520, and III, pl. CXLVIII, 13, better illustrated by Mackay in *Antiquity*, V (1931), pl. facing p. 459, no. 5.

perhaps with other types of alien or relatively transitory character. These results need checking by more exact methods of excavation. Nevertheless in 1946 the careful digging of a small area on the platform of the Harappā citadel (section HP XXX), with this problem in mind, showed the undoubted continuance of the mature Harappā culture through the six successive building-phases of the site. True, the same excavation revealed a variant culture at a lower level, beneath the defences; but the six phases of substantial baked brick construction of the upper levels may be regarded as the product of several centuries, perhaps four or five in number.[1] On the same calculation, the ten occupation-levels of Mohenjo-daro might, so far as excavated, represent more than seven centuries of essentially uniform ceramic. And we must remember that at Mohenjo-daro the underlying natural surface has never been reached, whilst at Harappā the largest mound other than the citadel—Mound E—has not even been trenched. The duration of the Harappā culture in terms of building-construction may well be even greater than can at present be calculated.

But, by way of giving verisimilitude to this astonishing stagnation, certain elements of change are in fact identifiable, and others doubtless await discovery. Thus Mackay notes that, at Mohenjo-daro, hand-made ware 'is uncommon in the upper levels, but we have a good many examples from the lower levels'. A similar differentiation applies to the incised ware from the site. The remarkable glazed ware, of light grey fabric covered with a polished purplish slip which was then glazed and combed with straight or wavy lines, comes only from very early levels. These and other minutiae are at present too isolated to tempt further research. On the other hand at Harappā, apart from the seeming restriction of a class of small seals to the lower levels,[2] there are in fact two significant differentiae which are likely to develop in importance. The first of these is the occurrence, mentioned above, of a series of potsherds of non-Harappan type in a stratum heavily sealed by the citadel-defences (below, p. 91). Whether these sherds represent a proto-Harappan culture or, more probably, an alien village-culture such as that of Periāno-Ghuṇḍai is not certainly deducible from the relatively small amount of material available, but the problem is one which must be watched in future excavation. The second of the differentiae relates to the other end of the story; it is the Cemetery H industry (two phases but apparently interrelated), which is now seen to be superimposed upon the Harappā culture after the deposition of a considerable mass of intervening débris (pp. 74 and 85). The intrusive culture, as represented by its pottery, has in origin nothing to do with the Harappā culture; its ceramic differs from that of the latter both in finish and in decoration, and its dwellings, as identified for the first time in 1946 on the Western Terraces of the citadel, are notably more roughly constructed than those of Harappā proper. Its analogues have not yet been identified, and it appears in fact as abruptly as did its Harappan predecessor. The suggestion has indeed been made, very hesitantly, that the Cemetery H intruders 'may belong to the Āryan invaders',[3] the conventional date for whose first incursion into India is the fifteenth century B.C. And here the risk which Indian archaeology is always ready to run in the search for a literary context lies once more across our path.

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[1] The salt which today rapidly disintegrates baked brick on exposure both at Harappā and Mohenjo-daro would be considerably less abundant and noxious if the soil were regularly cultivated and the surface-water, which now evaporates through the desert-sand and drags up with it the deep-lying salt, were absorbed systematically by plant-life. There is no evidence that anciently the walls of these cities suffered materially from salt. It seems reasonable therefore to assume something like seven or eight decades as the lifetime of a Harappā building well-constructed of baked bricks. Mackay (I, 47-8) is wrong in his inferences from modern salt-action.

[2] Vats, I, 324.

[3] Childe, *New Light on the Most Ancient East* (1934), p. 223.

Nor am I altogether disinclined to face that risk. The Āryan invasion of the Land of the Seven Rivers, the Punjab and its environs, constantly assumes the form of an onslaught upon the walled cities of the aborigines. For these cities the term used in the Ṛigveda is *pur*, meaning a 'rampart', 'fort' or 'stronghold'. One is called 'broad' (*pṛithvī*) and 'wide' (*urvī*). Sometimes strongholds are referred to metaphorically as 'of metal' (*āyasī*).[1] 'Autumnal' (*śāradī*) forts are also named: 'this may refer to the forts in that season being occupied against Āryan attacks or against inundations caused by overflowing rivers'.[2] Forts 'with a hundred walls' (*śatabhuji*) are mentioned. The citadel may be made of stone (*aśmamayī*): alternatively, the use of mud-bricks is perhaps alluded to by the epithet *āmā* ('raw', 'unbaked').[3] Indra, the Āryan war-god, is *puraṁdara*, 'fort-destroyer'.[4] He shatters 'ninety forts' for his Āryan protégé, Divodāsa.[5] The same forts are doubtless referred to where in other hymns he demolishes variously ninety-nine and a hundred 'ancient castles' of the aboriginal leader Śambara.[6] In brief, he 'rends forts as age consumes a garment'.[7]

Where are—or were—these citadels? It has in the past been supposed that they were mythical, or were 'merely places of refuge against attack, ramparts of hardened earth with palisades and a ditch'.[8] The recent excavation of Harappā may be thought to have changed the picture. Here we have a highly evolved civilization of essentially non-Āryan type,[9] now known to have employed massive fortifications, and known also to have dominated the river-system of north-western India at a time not distant from the likely period of the earlier Āryan invasions of that region. What destroyed this firmly-settled civilization? Climatic, economic, political deterioration may have weakened it, but its ultimate extinction is more likely to have been completed by deliberate and large-scale destruction. It may be no mere chance that at a late period of Mohenjo-daro men, women and children appear to have been massacred there.[10] On circumstantial evidence, Indra stands accused.

The combined weight, such as it is, of these various indications suggests the millennium 2500–1500 B.C. as a possible inclusive date for the mature Harappā civilization, without prejudice to the still-unplumbed depths of Mohenjo-daro.[11] But in conclusion let it be squarely stated once more that the Akkadian contacts are the only well-fixed points. Material for objective dating in the post-Akkadian period is at present very slight. The relative abundance of Harappan objects on Akkadian sites may be taken to imply that, in and about the time of Sargon, Harappan enterprise—presumably commercial[12]—reached its apogee. This in turn may, in the normal order of things, be taken to imply bracketing phases of rise and decline, extending on the one hand into the Early Dynastic period and on the other hand into the second millennium. I have therefore invoked Indra; nevertheless, even Indra's hostile citadels may be represented, not by the Harappan sites, but by others yet unknown to us. If so, we have to assume that, in the short interval which can, at the

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1 The exact meaning of *ayas* in the Ṛigveda is uncertain. If it does not merely imply 'metal' generically, it may refer rather to bronze than to iron. See A. A. Macdonell and A. B. Keith, *Vedic Index of Names and Subjects* (London, 1912), I, 31.

2 Ibid., I, 538.

3 IV, xxx, 20; II, xxxv, 6.

4 II, xx, 7; III, liv, 15.

5 I, cxxx, 7.

6 II, xiv, 6; II, xix, 6; IV, xxvi, 3.

7 IV, xvi, 13.

8 Macdonell and Keith, I, 356, 539.

9 Marshall, I, 110ff.

10 See in particular Mackay, I, 94f., 116ff. and 172; and below, p. 84.

11 It must not, of course, be assumed that the unexplored lowest levels of Mohenjo-daro are necessarily 'Harappan', any more than is the lowest level at Harappā itself.

12 If so, the extreme rarity of Mesopotamian objects at Harappā and Mohenjo-daro implies that the trade was balanced in consumable goods. But what?

most, have intervened between the end of Harappā and the first Āryan invasions, an unidentified but formidable civilization arose in the same region and presented an extensive fortified front to the invaders. The assumption is not an easy one, and seems to involve a wilful rejection of the massive fortifications with which the Harappans are now known to have girt themselves. Digging, and more digging, will ultimately solve the problem.

5. THE CEMETERIES

(*a*) Burials at Mohenjo-daro and Harappā

In 1937 a cemetery—hereafter known as R 37—was accidentally located immediately to the north-west of the little museum at Harappā, and Mr. K. N. Sastri, the Custodian, subsequently uncovered about fifty burials here. These present the only systematic cemetery of the true Harappā culture at present known to us. Its full publication awaits the report on the skeletal remains.[1] Meanwhile, some account of its cultural characters, particularly of its pottery, can be given here in anticipation.

Mr. Sastri's work, supplemented by further excavation in 1946, shows that the Harappans buried their dead in an extended position, with the head usually in a northerly direction and with an abundant supply of pottery. A discovery of special interest in 1946 was that of a coffin-burial with traces of a reed-shroud—the only example yet identified in India of a type of burial familiar in Sumer in the third millennium B.C. (below, p. 88).

* * * * * *

As an introduction to the preliminary report on the 1946 excavations, it will be convenient to tabulate the evidence of burial or mortality previously available from Harappā and Mohenjo-daro. Stray human bones and burials of doubtful period are mostly omitted. I also omit the so-called 'post-cremation burials' from both sites, since there is no evidence whatsoever that these have anything to do with human burial.[2]

A. *Mohenjo-daro*

(i) Skeletons of thirteen adult males and females and a child, some still wearing bracelets, rings and beads, were found in varied attitudes suggesting simultaneous death in Room 74 of House V, HR Area, Section B.

(ii) A group of six skeletons, including one child, were found in Lane 4 between Houses XVIII and XXXIII, VS Area.

(iii) A skeleton was found in Deadman Lane, HR Area, Section A.

All or most of these skeletons (i)–(iii) belong to a late period of the site. Their significance has been disputed: at any rate, they do not represent methodical burial.[3]

(iv) A group of nine skeletons, including five children, was found 'in strangely contorted attitudes and crowded together' in Block 10A, DK Area, in a pit with two elephant-tusks.

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[1] When the Anthropological Survey of India has prepared its analysis of the skeletal material, a full report on Cemetery R 37 will, it is intended, be published as a Memoir of the Archaeological Survey.

[2] These curiously-named 'burials' consist of large vessels containing 'smaller vases, bones of small quadrupeds, birds or fish, and frequently a variety of other small objects such as beads, bangles, terracotta figurines and chert flakes, sometimes mingled with ashes and charcoal. The urns in question are found at both sites in buildings of all periods . . . . . But it is only rarely that human bones are found in this class of urns. Indeed, out of 126 urns of this class . . . . at Harappā, only one contained a human bone, and that showed no signs of burning.' Marshall, op. cit., I, 86ff.

[3] Marshall, I, 79ff.

Mackay was inclined to ascribe them to a late period of the site, and suggested that they were 'the remains of a family who tried to escape from the city with their belongings at the time of a raid but were stopped and slaughtered by the raiders. One or more of the family may have been ivory-workers, and only the tusks for which the raiders had no use were not taken as loot'.[1]

(v) In the last phase of the city, the stair of a well-room in Block 8A, DK Area, G Section, 'was the scene of a tragedy which involved four deaths. On the stairs were found the skeletons of two persons, evidently lying where they died in a vain endeavour with their last remaining strength to climb the stairs to the street'. One of them was probably a woman. It appears that the 'second victim fell over backwards just prior to death'. Remains of a third and a fourth body were found close outside. 'There seems no doubt that these four people were murdered ..... It can be regarded as almost certain that these skeletal remains date from the latter end of the occupation of Mohenjo-daro and are not later intrusions. The facts that some of the bones of one of these skeletons rested on the brick pavement of the well-room and that the skull of another lay on the floor of the sediment-pit prove beyond doubt that both well-room and pit were in actual use when the tragedy took place.'[2]

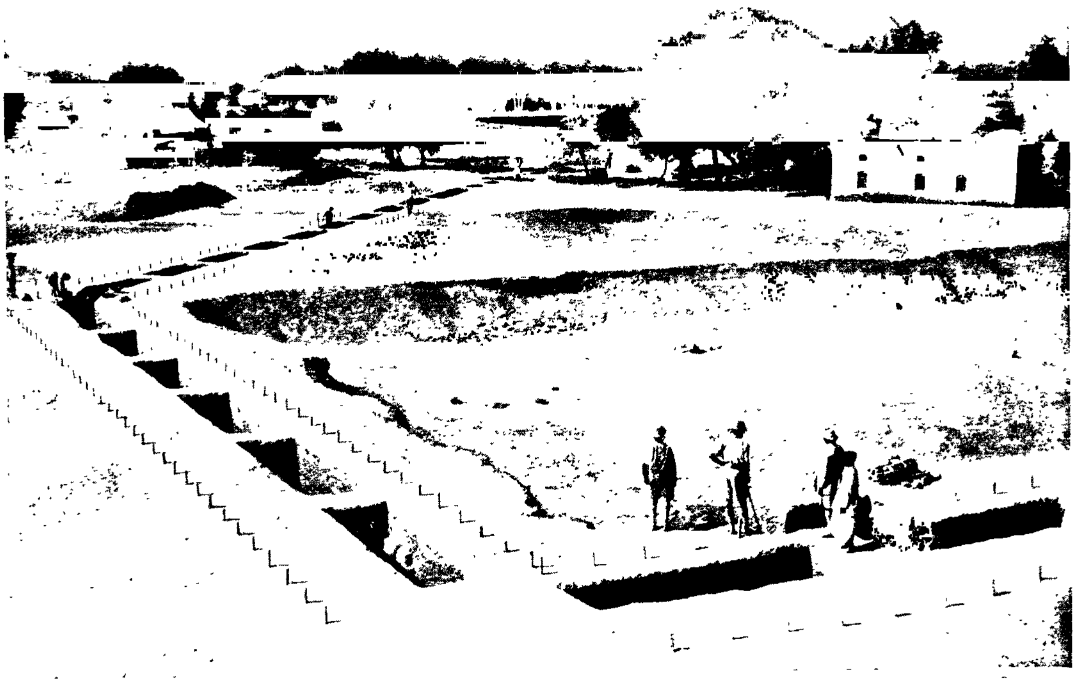
B. *Harappā*

(vi) On the south-eastern outskirts of the site as now visible, in Area G, a tightly packed mass of human skulls (twenty complete and fragments of others), intermixed with a relatively small number of human long bones, some animal bones, and pottery of Harappā types, was found between 4 feet and 5 feet 10 inches below the present surface. The collection had obviously been brought together after the previous exposure of the bodies, but in what circumstances cannot be conjectured.[3]

(vii) Two fragmentary human skulls with other human bones, thought to represent a 'fractional' burial, were found in a house of 'Stratum IV' on Mound AB.[4] This, if a deliberate burial, is the only one at present known from the higher mounds. The skulls may, however, be relatively modern, and it is best to follow Dr. B. S. Guha, who has examined them, in discounting the find.

(viii) 'Cemetery H', to the south of Mounds AB and J, comprises two strata. Stratum II, the lower and older, consisted of extended burials, sometimes with the knees slightly bent, at an average depth of 6 feet from the present surface. The general orientation was from east to west or north-east to south-west. The accompanying pottery was distinctive, showing no significant affinity with that of the Harappā culture proper.[5] Some of the burials were regarded as 'fractional', i.e. incomplete collections of bones assembled after the exposure of the body. It is not clear from the account, however, whether these were true fractional burials or whether they were merely fragmentary burials, disturbed by later interments or other agencies. Pottery similar to that of these burials is found on the surface and with the latest occupation of Mound AB, and occasionally in the great rubbish-layer to the south of the cemetery (see below, p. 85). Stratum I, overlying Stratum II and extending beyond it towards the east, lay within 2 or 3 feet of the surface. It consisted of true fractional burials, the skull and a few long bones being enclosed in large vessels with openings just large enough to take the separate bones after excarnation. Only babies were enclosed complete, in the 'embryonic' position. The openings of the urns were closed by lids or by complete or fragmentary pots. The decoration of the burial-urns

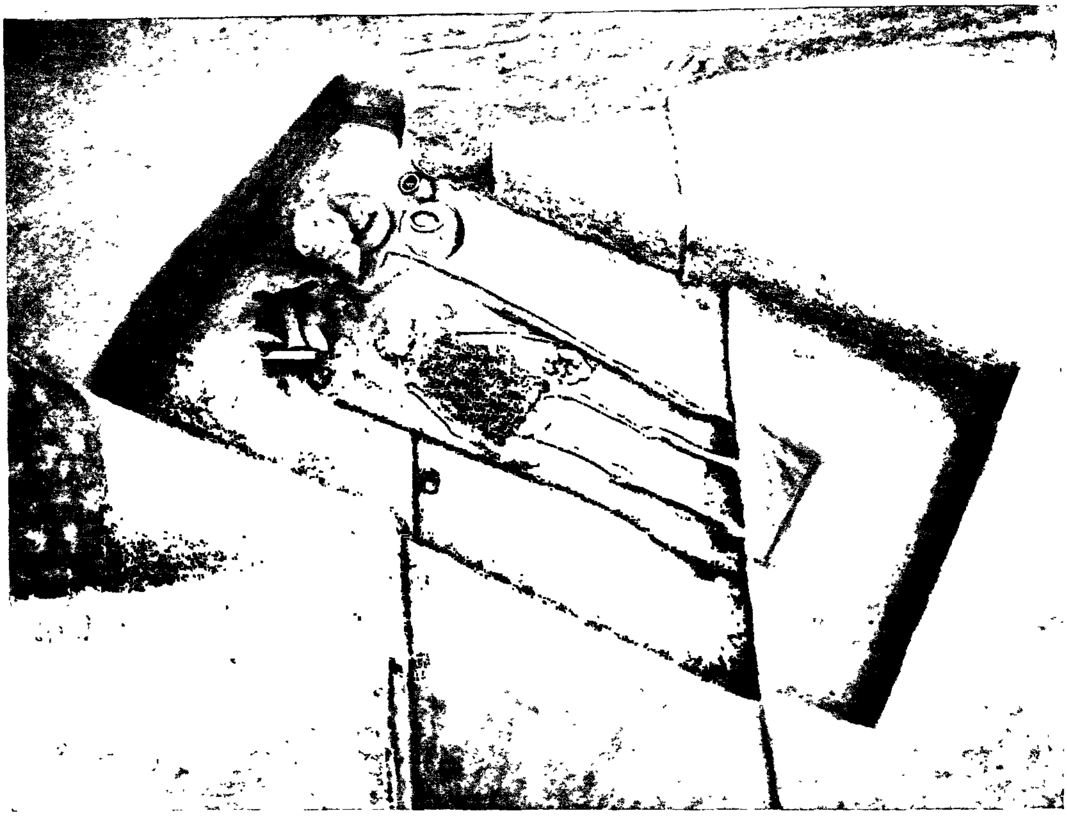
[1] Mackay, I, 117.
[2] Mackay, I, 94f.
[3] Vats, I, 197ff.
[4] Ibid., I, 161.
[5] Ibid., I, 220ff.



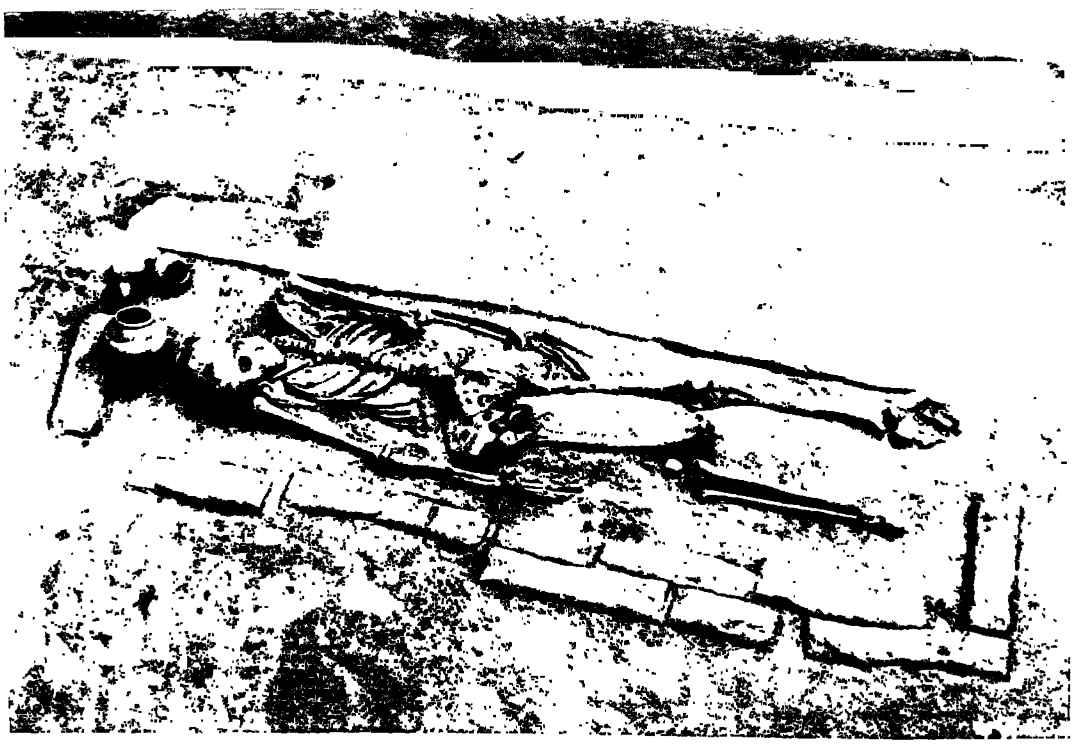
A. *Trench dug in 1946 to connect stratigraphically Cemetery H (foreground) with Cemetery R 37 (background)*



B. *Cemetery R 37, burials 1 and 2 (1946)*



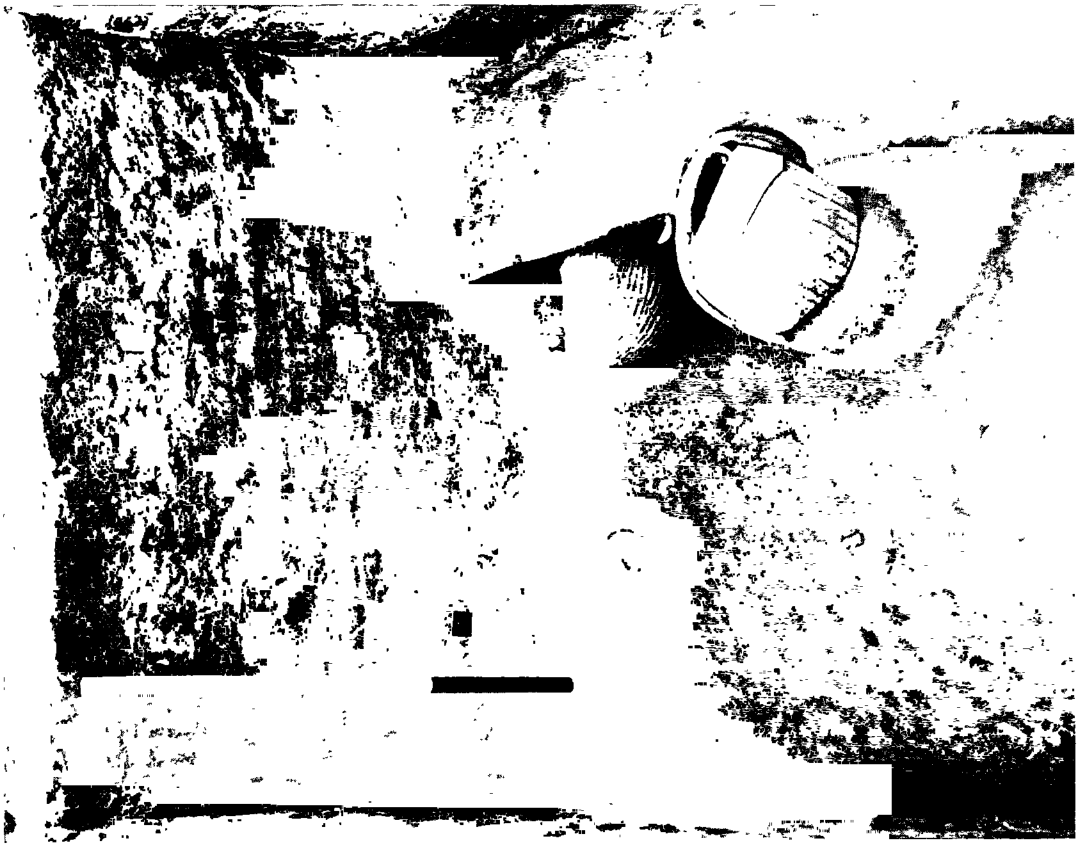
A. *Cemetery R 37, burial 5 (1946)*



B. *Cemetery R 37, burial 10 (1946)*



A. *Cemetery R 37: foreground, burial 5; background, part of mud-brick filling of burial 10 (1946)*



B. *Cemetery H, Stratum I: burials 11 and 12 (1946)*

was again distinctive, including human figures, animals and birds in obviously ceremonial or mythological contexts,[1] and quite unlike anything in the true Harappā culture. Fragments of this pottery are also occasionally found on the surface of the mounds.

(*b*) Cemetery R 37 at Harappā

The dual task of 1946 was (*a*) to uncover a limited number of additional Harappā burials of R 37 under closely observed conditions, and (*b*) to link up the Harappan Cemetery R 37 with Cemetery H, 120 yards to the north-east of it, by means of a long trench (pl. XXXVI A) and so to establish, if possible, the stratigraphical relationship between them. Both aims were achieved. Clear stratification showed that Stratum I of Cemetery H was not only later than R 37 but was subsequent to a deep intervening deposit of potsherds and other débris which indicated a considerable alteration of the site between the two cultures (pl. XXXIX). Stratum II of Cemetery H was not re-identified, but report and observation combine to show that it also was stratigraphically later than R 37.

An incidental discovery of interest was that of a prehistoric cart-track close above the natural alluvial clay beneath Cemetery H, at a depth of 13 feet below the present surface (pls. XXXV B and XXXIX). The track, running nearly east and west, is 13 feet wide over all and shows six ruts. The distance between each pair of corresponding ruts is 3 feet 6 inches to 3 feet 7 inches. This figure tallies with the gauge of modern Sindhi carts, which are similar in general character to the models from Mohenjo-daro[2] and Harappā[3] found in previous excavations. The track belongs to a very early phase of the site.

In detail, the evidence of the long exploratory trench joining cemeteries R 37 and H was as follows (pl. XXXIX). At the R 37 end, the natural soil was overlaid by two successive earthen deposits containing scattered sherds but no other evidence of occupation. One grave (No. 8), not yet explored, was cut into the lower of the two deposits. The other nine graves identified in 1946 were all cut into the upper deposit, but within it grave 4 overlaps grave 9. The deposit containing the graves slopes downwards towards the north and east to form a large sunken area which was gradually levelled by the subsequent deposits. The first of these, 1-2½ feet thick, covers the grave-layer and underlies a dense mass of potsherds and other débris, ranging up to 7½ feet in height and constituting the main filling of the sunken area. Towards the northern part of the trench, this infilling is covered by a further 2 feet of débris mixed with clay; and in this further layer were found two pot-burials of Cemetery H I type. A third burial of the same type was found in the next higher layer, above which two strata (2 feet in total depth) bring the section to the modern surface.

The section as a whole indicates that the Harappā Cemetery R 37 occupied slightly rising ground well to the south of the main habitation-areas. Between the latter and the cemetery lay a hollow of considerable but uncertain extent which, sometime subsequent to the disuse of Cemetery R 37, was deliberately levelled with débris largely consisting of a compact mass of potsherds. Thereafter, a further deposit of levelling-material was introduced before Cemetery H I came into being in the area explored. Although no burial of the adjacent (earlier) Cemetery H II was found in 1946, the section considered in relation to the depth as recorded and as recalled by Mr. Sastri indicates that this cemetery was within the range of the infilling and was therefore likewise later than R 37.

In the 1937–41 excavations forty-seven graves of R 37 were found, and in 1946 a further ten graves were identified. Of the latter, four yielded complete skeletons, four

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[1] Vats, I, 206ff.

[2] Marshall, II, 554; III, pl. CLIV, 10.

[3] Vats, I, 451 ; II, pl. CXX, 1–3.

had been disturbed, and two were not completely uncovered. In a total of eighteen instances, earlier burials had been cut by later graves, and in eight instances the latter had again been cut by tertiary burials. Nevertheless, the cemetery belongs to one and the same general stratum and was evidently in continuous use.

The body was normally extended, occasionally on one side or the other, with the head to the north (between north-west and north-east, but usually within a few degrees of north). Mr. Sastri observed only one exception, a burial with the head to the south. Grave-pits varied in dimensions, ranging from 10 to 15 feet in length, 2½ to 10 feet in width, and dug to a depth of 2 to 3 feet from the contemporary surface. An average grave measured superficially 10 by 3-4 feet, with a depth of 2 feet. The pit was generally wider towards the head. Its large size was due to the custom of including large quantities of pottery, mostly near the head but some also at the feet and along the sides and occasionally below the body. The number of pots accompanying a burial ranged from two to forty, with an average of fifteen to twenty. Most of the types were such as occur on habitation-sites of the mature Harappā culture.

Personal ornaments were sometimes worn by the dead.[1] In the 1946 series, a copper ring was found on the ring-finger of a right hand, while Mr. Sastri had previously found two skeletons each with a necklace of steatite beads, two with anklets of paste beads, and one with an ear-ring of thin copper wire. Shell bangles and beads of steatite and paste appear to have been the most common accompaniments.

Besides pottery and personal ornaments, toilet objects occasionally formed a part of the grave-furniture. From the total number of graves found in 1937–1946, twelve yielded each a handled copper mirror; others produced mother-of-pearl shells; one an antimony stick; and one, a large shell spoon.

It may be noted that some of the graves contained, besides a human skeleton, a few decayed animal-bones. One grave included the bones of a fowl, together with a small handled lamp, placed at the feet of the dead.

(c) The Graves of Cemetery R 37 found in 1946[2]

The burials found in 1946 in Cemetery R 37 were numbered 1–10 in order of their discovery.

Burial 1.—The burial (pl. XXXVI B) contained the extended skeleton of a strongly-built male, oriented from south to north (4° magnetic) with the head to the north and slightly turned to the west. The grave-pit, only a foot and a half below the present surface, was 11 feet long, 4½ feet wide and 2½ feet deep. The skeleton had been much disturbed by monsoon-rains, which had exposed a part of it. With it were twenty-one pots, all placed near and about the head except two, of which one lay along the left side and the other below the skeleton itself.[3] The types represented were I, II*c*, III*e*, IV*a*, IV*c*, IX, XVII*d*, XXVII*b*, XXVII*c*, XXIX, XXXVII*a* and XL (below, pp. 101 ff.). A chert flake and a steatite disc-bead were found near the right fibula.

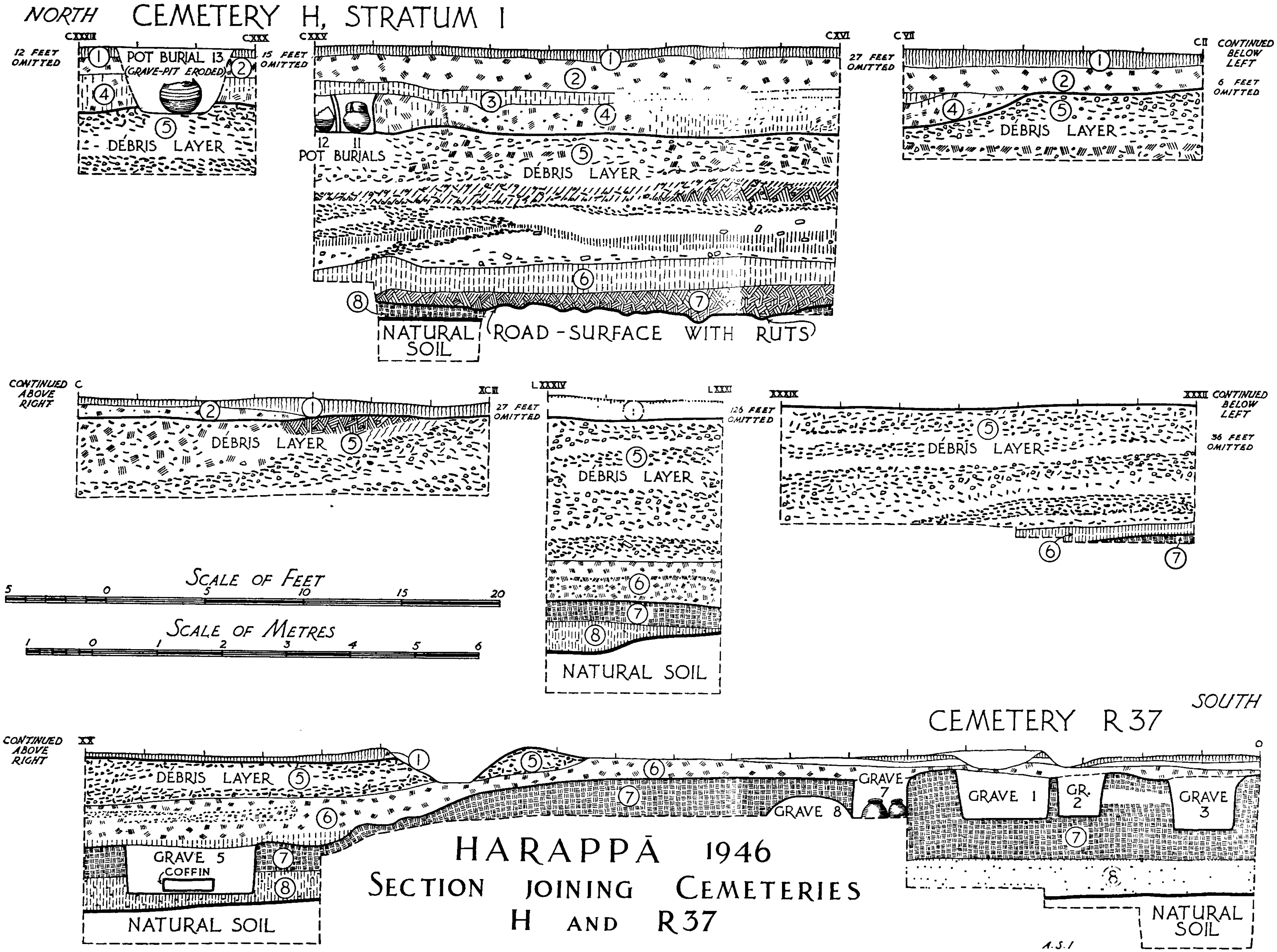
The general contour of the skull is long and ovoid (length-breadth index 73·30) with high forehead, prominent right superciliary arch (the left broken) and high and prominent nasal bridge. The right frontal eminence is slightly pronounced, due probably to distortion; the corresponding left region is not so well-marked, owing to disintegration. The orbits are square-shaped. The mastoid processes are remarkably prominent, especially the one on the right. The occipital shows strong muscular impressions. A small remnant of the first

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[1] It may be observed that personal ornaments and toilet objects were totally absent from the burials of Cemetery H, Stratum II, except in two cases, in one of which a female was found wearing a gold bangle on the left wrist, while in the other a crushed human jaw had three surviving teeth bound with fine gold wire for security or decoration.

[2] Details relating to the skeletons are provided by Mr. H. K. Bose, Anthropological Assistant, Archaeological Survey of India, working under the direction of the Anthropological Survey of India.

[3] The practice evidently was to place the body nearly half-way up in the grave-pit.



HARAPPĀ 1946
SECTION JOINING CEMETERIES
H AND R37

premolar and highly worn-out incisors and canine teeth are present on the left side of the upper jaw. The portion of the alveolus behind the first premolar is completely absorbed. The right half of the alveolus shows sockets without teeth for the central incisor and the canine and the roots only of the lateral incisor and first premolar. The crown of the second premolar is very much worn out. The second molar shows a deep carious cavity on the postero-medial aspect. The alveolar portion at the site of the third molar has been absorbed.

The cranial sutures are not visible excepting the parieto-temporal, occipito-mastoid and a part of the parieto-occipital. As far as could be observed, the sagittal, lambdoidal, coronal and basilar sutures are all closed.

The lower jaw is well-developed and complete The left half shows all the teeth excepting the second molar. The right half has the incisors, canine, and the first premolar only, the second premolar and the molars being absent and the corresponding alveolar margin completely absorbed. The dental arch shows a relatively rounded form.

From the general appearance of the skull and the lower jaw, it can be presumed that they belonged to a male adult who suffered from serious dental troubles. From the state of the closure of the sutures, the age may be inferred to have been 40–50 years. The height of the skeleton was about 5 feet 10 inches.

Burial 2 (pl. XXXVI B), immediately west of the former, comprised an extended female skeleton, oriented from south to north (14° magnetic), with the head to the north and turned to the east. The grave-pit, 10¼ feet long, 2½ feet wide and 2 feet deep, was only a foot below the surface. The skeleton was fairly intact except for the right ulna and radius which were dislodged. The legs were slightly flexed.

The pottery included twenty-one pots, mostly near and around the head, though some lay beneath the skeleton and two, a jar (type XLI) and a round water-jar (type XL*a*) immediately south of the legs. Types represented were I*d*, II*a*, III, IV, V, V*a*, V*b*, VI, VI*b*, XIV*a*, XVII, XVII*a*, XVII*b*, XXVIII*a*, XXX, XXXII, XL*a*, XLI and XLII*a*. A copper mirror (pl. LII C) was found in the round water-jar mentioned above, and near the feet lay a disc-bead of steatite.

The skull is complete excepting the bones forming the left norma lateralis. The right side of the face is complete, and in the maxillary region a complete set of fully erupted teeth can be seen, though the third molar is very small and consists of a single cusp only. The left side is incomplete from the total loss of the zygomatic and the upper part of the maxillary bones. It has the incisors, canine and molars 1 and 2, and three open sockets for the premolars and the third molar.

From the top the skull is long and ovoid (length-breadth index 71·43 ?). The right superciliary arch is not prominent and the glabellar region is broken. The right frontal eminence is not marked as the bone in this region is fractured and depressed. The right orbit is small and squarish. The mastoids are short and small though the left one is partly broken and has disintegrated. The nasal bridge is high and prominent.

The spheno-basilar suture appears to have united. The other sutures, as far as can be seen, are open excepting the lower part of the right coronal suture which seems to be in the process of closure.

The lower jaw is small and light, with a narrow dental arch. All the sixteen teeth are present and well-preserved excepting the second right molar which is partially broken. The mandibular angle is round on the right side and lost on the left. The third left molar appears to have newly erupted. The chin is well-formed and squarish.

From the skull and the lower jaw it appears that they belonged to an adult female about 30 years of age.

The height of the skeleton was 5 feet 4 inches.

Burial 3 was not completely exposed but had been disturbed. Only a fragmentary tarsus was found. Pots, twenty-one in number, lay mostly at the sides. They included types I*b*, II, III*b*, IV*b*, XI*a*, XIV, XVII, XVII*b*, XXXIII, XXXIII*b*, XXXIX*f*, XL*b* and XLI*c*.

Burial 4 had been disturbed by burials 1 and 2, which overlapped it. The skull and a tibia were found. The funeral pottery included types I*c*, II*b*, IX*d*, IX*e*, XIV*c*, XIV*d*, XIV*g*, XXIII, XXIV, XXVII*d* and XXXIII*c*.

Burial 5 was a coffin-burial, the only one of its kind so far known from the Indus Valley cultures. The body, probably that of a female, was placed within a wooden coffin, 7 feet long and 2 to 2½ feet (towards the head) wide. Owing to the highly-decayed state of the material the exact height of the coffin could not be ascertained, but it was capacious enough to accommodate the body without any constriction. The thickness of the sides of the coffin was 1½ inches; and streaks of sticky black substance running over the toes (pl. XXXVII A) suggested the presence of a lid. Traces of a reed-shroud, available from the pelvic girdle to the upper vertebrae, were also met with. The presence of some light green substance over and around the body suggested the use of preservatives; the final chemical report is not yet available, but will be included in the substantive publication of the cemetery.

The grave-pit which contained the coffin and the concomitant pottery was nearly 4½ feet below the present surface and measured 11 feet long, 5½ feet to 6½ feet (towards the head) wide and 2½ feet deep.

The skeleton lay in an extended position from south to north (343° magnetic), the head to the north and face upwards. It was fairly intact except for the skull which had been badly crushed.

Of the thirty-seven pots recovered from this grave the majority lay huddled near and against the head of the coffin. Some pots lay to the west of the coffin, while one was inside the coffin itself. The types represented were I*e*, II*c*, IX*f*, XVII, XXII*a*, XXIII, XXIII*a*, XXIII*b*, XXIII*c*, XXVII*d*, XXXIII*a* and XXXIII*c*. On the right middle finger was a plain copper ring; one shell ring (probably ear-ring) lay to the left of the skull and two to the left of the shoulder.

The skull had been crushed to fragments through the collapse of the coffin. Of the three largest fragments, one shows the crushed upper jaw of both sides. On the right it shows the second incisor, one canine and two premolars and on the left, two incisors, one canine and two premolars, all worn out. On the left, the malar, part of the lateral wall and floor of the orbit, the greater wing of the sphenoid and a part of the squamous part of the temporal bone can be seen.

In the mandible, the body, ramus and coronoid process are almost complete on both sides, and the left condyle can be seen articulated in a mass behind the zygomatic fossa. The chin portion is partly lost. The right half shows eight teeth complete. All the teeth excepting the first molar are worn out. In the left half, only four teeth are visible with a gap between the canine and the first molar where the alveolar margin shows absorption suggesting that the individual lost the premolars at an early age.

The reverse of the same fragment shows an upper section in which (*a*) on the left side three worn-out molars are seen, the first with a carious cavity, (*b*) in the central portion a mass of depressed bones driven forwards between the two halves of the upper jaw showing the fractured first and the distorted second and portions of the lower cervical vertebrae, and (*c*) in the right portion the much worn-out second and third molars. The first molar is absent and the corresponding alveolar interval is partly absorbed. There is an uprooted incisor sticking near the right upper molar, probably belonging to the left lower set. In the lower jaw the breadth of the ramus is thin and the appearance of the mandible is feminine. The general appearance of the face is small and feminine.

The second main fragment of the skull shows part of the right frontal bones, right malar and remains of the right frontal process of the maxilla, enclosing between them the distorted right orbit. The frontal bone is definitely feminine in type, since it has a prominent frontal eminence and an indistinct superciliary arch. The neck of the right side of the mandible is clearly visible and its condyle can be seen in a crushed condition close to the mandibular fossa. It also shows a part of the right temporal bone in which the mastoid process is small and feminine in type.

The third fragment shows a portion of the left parietal and a portion of the left frontal, folded at the coronal suture and coalesced together.

From the completely erupted molars and the size of the teeth and from the appearance of the lower jaw and frontal bone and from other available features which could be observed in the above fragments, it can be presumed that the subject was a female 18–25 years of age.

The burial presents features which have not previously been recognized in India but may be found to have some significance in a consideration of the relations between the Harappā civilization and Sumer. Both the coffin and the reed-shroud are familiar in Sumerian cemeteries of the third millennium B.C. At Ur, in graves of Sargonid and pre-Sargonid times, 'the dead man was laid at the bottom of the shaft either wrapped in matting or enclosed in a coffin which might be made of matting, of reeds or wickerwork, of wood or of clay'.[1] To what extent wrapping and coffin were combined in a single grave was difficult to determine. In most cases the matting had been reduced to 'a film of very fine white powder', as at Harappā, where some indication of the lines of the reeds was also retained, though insufficiently to indicate the weave. At Kish, the 'A' cemetery likewise included graves which had been lined with reed-matting.[2] In other words, the Harappā burial represents a mode customary in Sumer during a considerable period which overlapped and probably preceded that of Cemetery R 37. More than that the present evidence does not warrant.

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[1] C. L. Woolley, *Ur Excavations II: the Royal Cemetery* (London and Philadelphia, 1934), pp. 135ff.

[2] E. Mackay, *Report on the Excavation of the 'A' Cemetery at Kish, Mesopotamia*, Part I (Chicago, 1925), 13 ; Part II (1929), 130.

Burial 6 had been badly disturbed, and only a few animal bones (probably sheep) were found, with no human bones. Three pots representing types IX, XXII, XXIII*a* comprised the funeral pottery.

Burial 7 was not explored, but in the northern fringes of the grave were three pots, of types IV, XVII and XL.

Burial 8 was also incompletely excavated. It appears to have been covered by a low mound. Only a portion of the pelvic region and of the femurs was exposed, and beside these lay an isolated sheep-bone. Two pots, of types XXIV*b* and XXIII, were recovered.

Burial 9 was disturbed by burial 4, which partially overlay it. Only a hand, with complete phallanges and metacarpals, was found. An interesting feature of the grave was a group of over fifteen flat dishes representing types XXX, XXX*a*, XXX*b*, XXX*c*, XXXI, XXXI*b*, XXXII*b* and XXXII*c*.

Burial 10 showed two exceptional features: (i) a mud-brick lining or coffin around the body (pl. XXXVII B), and (ii) a heaped mud-brick filling of the southern end of the grave (pl. XXXVIII A). The grave-shaft was of unusual dimensions—15 feet long, 10 feet wide and 3 feet deep. The body, that of a male, was placed in the northern part of the grave-pit with the head towards the north (4° magnetic).

The mud-brick filling of the southern end of the grave stood to a height of 1½ feet above the surrounding level (pl. XXXVIII A), and indicates that this burial, like No. 8, was marked by a low mound, resembling that of Muslim graves at the present day.

Funeral pottery was unusually sparse in this grave. Only two pots were found (types III*a* and XI*c*), but these were enough to class the burial as of the true Harappā culture.

The skull was almost complete. The zygomatic process of the left temporal bone and the third left upper molar are missing. The general contour of the top of the skull is long and ovoid (length-breadth index 71·28). It has a high forehead, prominent superciliary arches and a high nasal bridge. The facial and frontal bones, mastoid processes and occipital bone are prominent and masculine in type. The orbits are square-shaped. Muscular impressions in the occipital region are well-marked. The upper right third molar is unerupted. The sutures on the vault of the skull are all open. The lower part of the coronal sutures have been obliterated. The spheno-basilar suture is closed.

The lower jaw is well-formed with a prominent chin having prominent muscular impressions. The left angle of the mandible is everted. The teeth are all present excepting the right lateral incisor which has fallen out. Both the third upper molars are well-developed and unworn. The shape of the dental arch is ellipsoid.

From the above it appears that the skull belonged to a male 30–40 years of age.

(*d*) THE GRAVES OF CEMETERY H I FOUND IN 1946

Three pot-burials of Cemetery H, Stratum I, were found in 1946, and were numbered 11–13. Their stratigraphical position has been noted above (p. 85); it may here be recalled that Nos. 11 and 12 were co-eval, and that No. 13 was slightly later.

Burial 11.—The pot, painted in black around the shoulder (pl. XXVII B, and fig. 25, HI 1), was covered with the fragment of another jar with finger-groove pattern.

It had to be sawn into halves for the proper extraction of the bones which it contained. These had been inserted without system, with the skull on one side near the centre, in an upside-down position, surrounded by long bones. The following is a list of the bones:—

Skull	1
Lower jaw fragments	4
Femora	2
Tibia	2
Humerus fragments	6
Fragments of other long bones ..	8
Scapula fragments	4
Patella	2
Vertebrae with fragments ..	8
Phalanges	10

The skull was almost complete, with a part of the left condyle of the lower jaw sticking in a mass of earth in the corresponding mandibular and infra-temporal fossa. Viewed from above, the outline of the skull is long and ellipsoid (length-breadth index 76·30). It has prominent frontal and parietal eminences, with short vertical

forehead and indistinct superciliary arches. The nasal bridge is of moderate height and length. Six teeth are present on the right side, but the two last molars have dropped out. Of the seven teeth present on the left side, the central incisor has dropped out and the last molar is very slightly worn in the posterior cusp. The left orbit is circular and the right one oval, probably due to distortion. The mastoid processes are small and short. The sutures on the vault of the skull are all open. The spheno-basilar is closed. The lower jaw is in fragments.

The skull is that of a female 25–30 years of age.

Burial 12 (pl. XXXVIII B), a foot from No. 11, had been disturbed and the pot was very fragmentary. It had been ornamented with horizontal finger-grooves.

The human bones contained by the pot were also fragmentary and lay in a jumbled mass. Strangely enough, *two* skulls, which have been numbered 12(*a*) and 12(*b*), were included, although the long bones appear to have belonged to a single individual. Both skulls are in a very bad state of preservation, the facial part of the one being completely smashed.

The following is a list of the bones:—

Skulls	2
Fragments of femur, tibia and other long bones ..	16
„ of mandible	1
„ of vertebrae	4
„ of pelvic brim	4

Skull 12(*a*) is an almost complete skull with the portion of the right condyle of the mandible sticking in a mass of earth in the infra-temporal fossa. Viewed from top the outline is long and ovoid (length-breadth index 73·99) with prominent frontal eminences. The parietal eminence is more marked on the right. The forehead is short and vertical with indistinct superciliary arches. The nasal bridge is moderate in height and length. The orbital openings are almost circular on both sides. The crowns of all the teeth are eroded to the alveolar margin excepting the third right upper molar which is unerupted. The right mastoid process is small and the left is partly broken. Muscular attachments on the occipital bone are not well-marked.

The coronal suture is open on the right but it cannot be observed on the left due to disintegration of the table. The sagittal and lambdoidal sutures are complete and open. The spheno-basilar suture seems to be still ununited.

The skull seems to belong to a female 18–25 years of age.

Skull 12(*b*) has a disintegrated facial part. The frontal bone is only partially present on the left side showing a prominent frontal eminence. The contour appears to be almost ellipsoid though slightly distorted on the right. The zygomatic processes are absent on the right and partially present on the left. The mastoid processes are very small and short.

The coronal suture is only partially visible and open. The sagittal suture is visible in the anterior aspect and is open. The lambdoidal suture is open as far as can be seen. The sphenobasilar suture is open.

The skull appears to be that of a female of less than 25 years of age.

Burial 13.—The jar had already been exposed and badly disturbed by the rains.

It contained some fragments of the bones of the skull, long bones and others, very few in number, in comparison with the contents of the other two pot-burials.

The following is the list of bones found in the pot:—

Fragments of skull	10
„ of lower jaw	2
„ of fibula, humerus, radius, etc. ..	10
„ of ribs, vertebrae, etc.	10
„ of phalanges	4

6. THE POTTERY

(*a*) From the Defences

Three groups of sherds from cutting HP XXX through the western defences of the citadel straddle the work of construction and suggest important inferences relating to the

early occupation of the site. They are not sufficiently extensive to enable firm conclusions to be drawn, but they provide a useful guide to future excavation.

The three groups are derived: (i) from the only occupation-layer (pl. XXII, level 26) which preceded (and immediately underlay) the defences; (ii) from the material which accumulated during the first stages of construction, i.e. from the building-level 26A; (iii) from the actual material of which the defences were built. Group iii, though derived from integral parts of one and the same structure, is divisible into two sub-groups: (*a*) Sherds incorporated in the mud-bricks of the 'rampart', wall and platform and consisting of pottery essentially similar to Group i—evidently the relics of the earlier occupation which happened to be lying about at the site where the bricks were quarried; and (*b*) sherds incorporated in the earth, mud, working-platforms, etc., which constituted the front of the 'rampart' and the greater bulk of the platform and rose gradually as the principal task, the construction of the mud-brick wall, proceeded. This sub-group mainly represented the culture of the actual builders, i.e. the true Harappā culture.

The pottery of Group i from the early occupation-level (layer 26) underlying the mud-brick defensive wall shows an individuality which isolates it from the familiar Harappā ceramic. Only thirty sherds were found, but of these not more than one (an unspecialized foot-stand, fig. 8, 9) has any analogue in the mature Harappā culture. As a whole, the ware of this early group is finer than that of the latter, and its slip is mostly of a dark purple-red with a notably dull matt surface. More than half of the total number of sherds are decorated with carefully-ruled horizontal black bands, and one sherd shows a horizontal line impressed by a cord (pl. XL, 7). The commonest type is a well-made globular beaker with straight or slightly everted rim, which is usually painted black externally, and sometimes with a pedestal-base. Generally, its analogues are to be sought in the 'Zhob culture' of northern Baluchistan.[1]

Group ii, from the building-level of the defences, consists of only five sherds, at least two of which belong to the same series as Group i.

Group iii*a*, from the actual mud-bricks of wall and 'rampart', about 150 sherds, is also largely of the same series, and indeed includes only two sherds of definitely Harappā types (below, figs. 9, 18 and 26).[2] One sherd (pl. XLII, 9) shows the concentric-semicircle design which is found on a sherd from Periāno Ghuṇḍai in the Zhob valley, a site on which the Harappā culture is not represented; and the shape of the latter sherd is identical with that of the globular beakers of our Groups i–iii*a*. The large Group iii*b*, on the other hand, from the earthen make-up of the 'rampart' and the platform, is almost entirely of the true Harappā culture, with the exception of six sherds, of which one (pl. XLII, 10) is comparable with pottery from the pre-Harappā layers at Amri in Sind.

In these groups, the contrast between the true Harappā sherds introduced at the time of construction and the non-Harappā sherds of the preceding or lingering occupation is so marked as to indicate the probability of a basic difference of culture. The affinities of the pre-Harappā phase are not yet evident, and in any case a far more ample representation of

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[1] I adopt the established phrase 'Zhob culture' with reluctance. In the present rudimentary stage of research, it has a momentary utility as indicating miscellaneous groups of red-ware pottery from northern Baluchistan. But the Zhob valley-Loralai region in fact produced very various ceramic industries, not all of them red-ware; and in any case we have little more than the pottery of these sites, and pottery in itself constitutes an 'industry' but not a 'culture'. We know at present hardly anything of the cultural context of these ceramic industries.

[2] The similar incorporation of sherds of an earlier culture in the mud-bricks used by a later one was observed by Brigadier E. J. Ross in his careful work at Rānā Ghuṇḍai, northern Baluchistan. *Journal of Near Eastern Studies*, V, No. 4 (Chicago, 1946), p. 295.

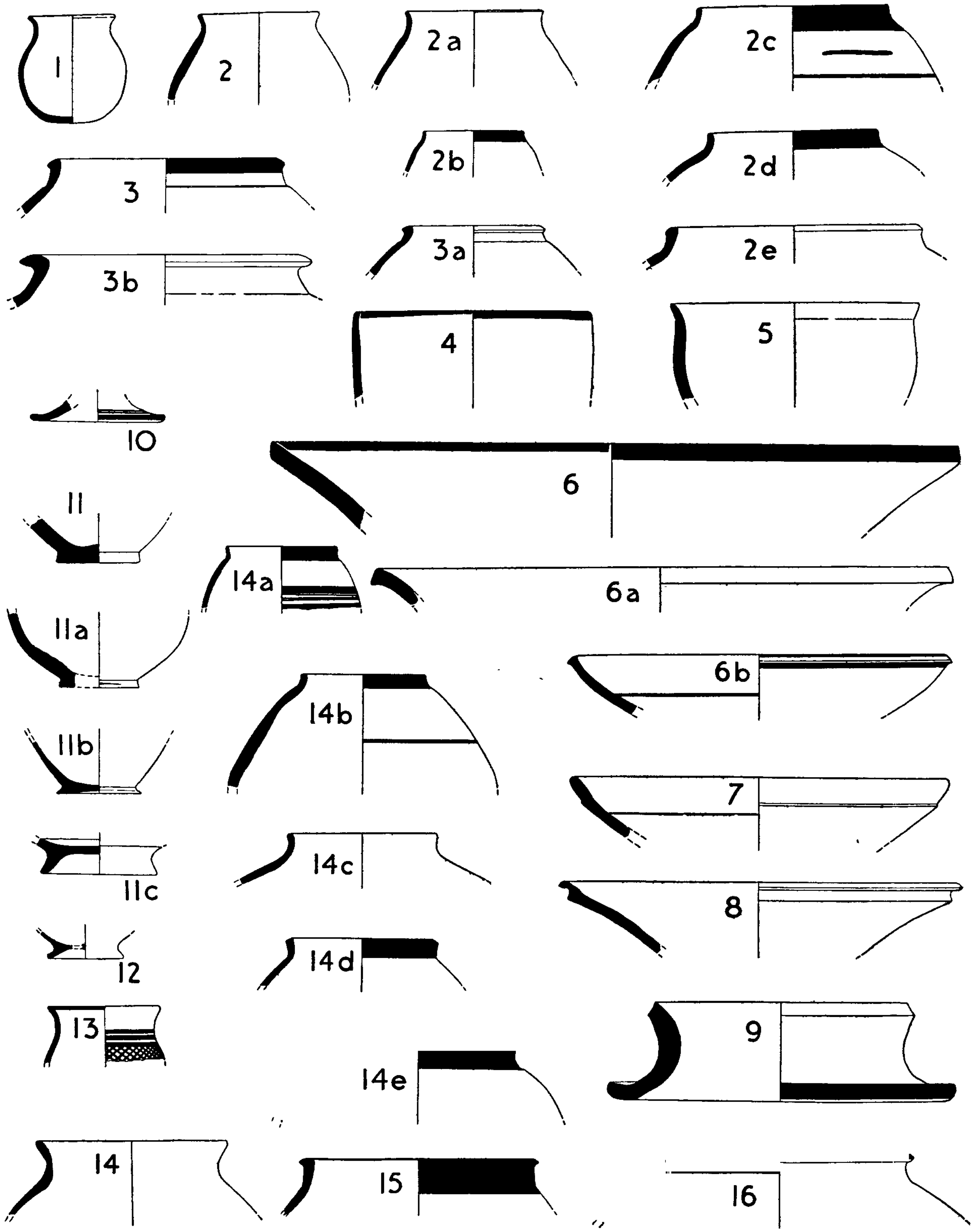


FIG. 8. *Early pottery from the defences.* ¼

it is necessary before definite results can be expected. The provisional inference, however, is that the building of the defences marked the first impact of the Harappā culture on this site, and that the builders were preceded here by a town- or village-occupation representing a variant or even alien culture.

Group i

Fig. 8

1. Small *loṭā*-shaped vase with flaring mouth and rounded base. This type does not occur in the mature Harappā culture.

2. Medium-sized globular vase with flaring rim (shape of base unknown). Variant 2*a* has a straight rim, while 2*b*, of unusually fine ware, has a slight ledge at the neck and the rim is painted with a black band. See also pl. XL, 3. Variants 2*c* and 2*d* (also pl. XL, 2) have a wide mouth and bulged profile, while 2*e* has a slightly clubbed rim. The shape of the base in all these cases is unknown. It may be noted that these vases are characteristic of the pre-rampart industry and are absent from the mature Harappā culture.

3. Jar with ledged neck and beaded rim. Variant 3*a* is smaller with a shorter neck, while 3*b* has a beaked rim. Similar rims and ledged necks are also found in the mature Harappā culture, but the complete shapes of the early examples here illustrated are unknown.

4. Straight-sided bowl. It may perhaps be compared with Mackay type UA, pl. XLI, 72 in having straight sides, but the shape of the base of the present example is unknown.

5. Bowl with flaring rim. This type does not occur in the mature Harappā culture.

6. Basin with oblique-edged rim. Variant 6*a* is slightly concave. Variant 6*b* has a convex upper profile and a nail-head rim. See also pl. XL, 6.

7. Basin with slightly cordoned rim. This type does not occur in the mature Harappā culture.

8. Basin with sharply carinated shoulder and slightly concave lower profile. This type does not occur in the mature Harappā culture.

9. Ring-stand with recurved base. The type is common in the mature Harappā culture.

10. Small lid of fine ware, painted externally with black bands. See also pl. XL, 4.

11 and 11*a*. Lower portions of vases with a disc-base. Variant 11*b* has a slightly concave base, while 11*c* has a pedestal-base.

Pl. XL

1-3. Rim-fragments with black bands. See also fig. 8, 2*b*.

4. Fragmentary lid, painted externally with black bands. See also fig. 8, 10.

5. Sherd painted with black bands.

6. Fragmentary basin with nail-head rim and black bands, both inside and outside. See also fig. 8, 6*b*.

7. Rim-fragment of a basin of coarse ware, with horizontal cord impression.

Group ii

Fig. 8

This group yielded only five sherds which are essentially similar to those from Group i. They include a small pedestal-base (fig. 8, 12), resembling 11*c*.

Group iiia

This group yielded a relatively larger quantity of pottery closely related to Groups i and ii. The painted designs include, besides simple horizontal bands round the body and the neck (pl. XLII, 1-8), oblique bands and groups (pl. XLI, 5 and 9), vertical wavy lines (pl. XLI, 6), criss-cross pattern (fig. 8, 13) and concentric loops (pl. XLII, 9). The last pattern occurs on a fragmentary vase from Periāno Ghuṇḍai in the Zhob valley of Baluchistan (pl. XLII, 9*a*, and fig. 9, 32*a*).

Figs. 8 and 9

13. Vase with flaring mouth, shoulder decorated with bands and criss-cross pattern. See also pl. XLI, 1.

14. Medium-sized vase with flaring rim. It is a thicker and larger variant of 2 (see above). Variant 14*a*, of unusually fine ware, has a straight rim, painted externally with black bands. Variant 14*b* (also pl. XLII, 3) has tapering sides, while 14*c* has a wide mouth and bulged profile. Variant 14*d* has an oblique-edged rim, which is more prominent in 14*e*.

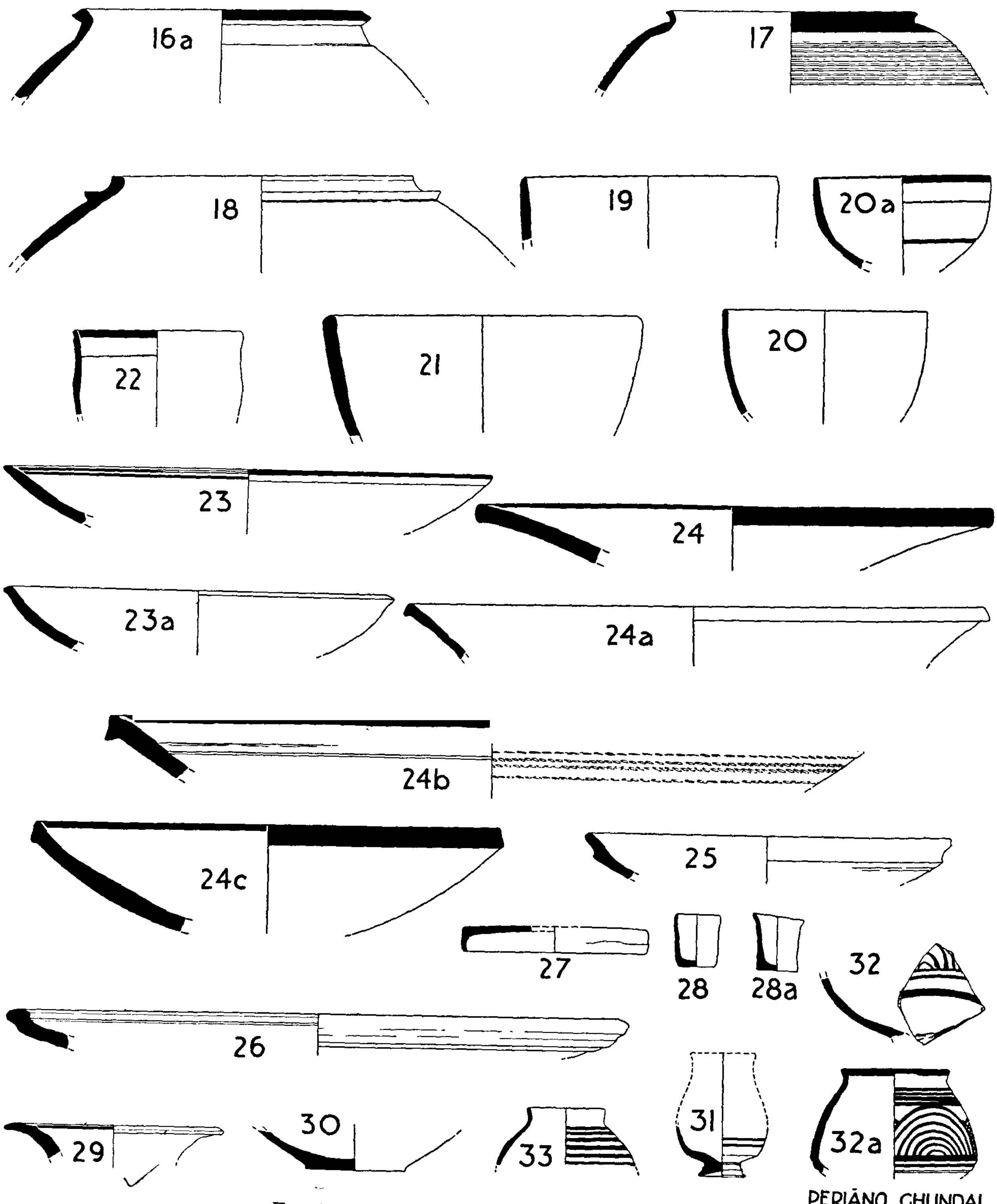


FIG. 9. *Early pottery from the defences.* ¼

15. Wide-mouthed jar with straight neck and beaded or out-turned rim.
16. Jar with ledged neck and beaded rim. Variant 16*a* has a beaked rim.
17. Jar with grooved bulbous exterior and externally painted under-cut rim. See also pl. XLII, 7.
18. Large jar with flange at the neck evidently to receive a lid. The type, not found at Mohenjo-daro, is represented by a few examples at Harappā.
19. Straight-sided bowl, similar to fig. 8, 4.
20. Bowl with rounded sides. Variant 20*a*, externally decorated with black bands, has a slight carination. The type does not occur in the mature Harappā culture.
21. Bowl with slightly tapering sides, smooth outside and rough inside. The type does not occur in the mature Harappā culture.
22. Bowl with slightly concave upper profile.
23. Simple rimless dish with rounded profile. See also pl. XLI, 8. Variant 23*a* has a slightly beaked or out-turned rim.
24. Large basin with beaked rim. Variant 24*a*, of thinner fabric, has a slightly concave upper profile. Variant 24*b* has a more prominent beaked rim and bears cord-marks on the exterior. Variant 24*c* has an oblique-edged rim and a convex profile.
25. Basin with cordoned or flanged rim. It is a variant of 7 (fig. 8).
26. Basin with inverted rim and corrugated upper profile. The type recurs in the mature Harappā culture but is not very distinctive (Mackay Type V, pl. LXXXII, 27).
27. Miniature dish with flat base, straight sides and slightly incurved rim. The type does not recur in the mature Harappā culture.
28. Miniature cylindrical pot with flat base. Variant 28*a* has a flaring mouth. The type does not occur in the mature Harappā culture.
29. A unique piece of indeterminate shape, with an internally painted broad flaring rim, which is provided with a hole, evidently for suspension. See also pl. XLI, 4.
30. Lower portion of a vase with a disc-base.
31. Lower portion of a slightly carinated vase with a prominent ring base. Restored from an analogous type from Periano Ghuṇḍai in the Zhob valley, northern Baluchistan.
32. Sherd ornamented in black with horizontal bands and concentric circles, comparable with 32*a* from Periāno Ghuṇḍai, northern Baluchistan. See also pl. XLII, 9 and 9*a*.

Pl. XLI

1. Rim with black bands and criss-cross pattern. See also fig. 8, 13.
2. Rim painted externally with broad black bands.

3 and 7. Sherds of thick ware, painted with black bands.

4. Rim-fragment with broad painted black bands and a hole for suspension. See also fig. 9, 29.
5. Sherd painted with horizontal and oblique black lines.
6. Sherd painted with black horizontal and vertical wavy lines.
8. Upper part of a rimless dish with internal and external black horizontal lines. See also fig. 9, 23.
9. Basin painted externally with a horizontal black band and curved lines.

Pl. XLII

1, 2, 4 and 5. Rim-fragments painted with broad black neck-bands.

3. Vase painted with a broad black neck-band and a horizontal line below. See also fig. 8, 14*b*.

6 and 8. Rim-fragments painted with broad black neck-bands and horizontal lines below.

7. Jar with grooved exterior and externally black-painted rim. See also fig. 9, 17.
9. Sherd showing black concentric-semicircle design, comparable with 9*a*, a sherd from Periāno Ghuṇḍai. See also fig. 9, 32 and 32*a*.

Group iiib

This group yielded a fair quantity of pottery which essentially belongs to the mature Harappā culture in ware, shape and decoration and is readily distinguished from the preceding groups. Exceptions are provided by six sherds from the front portion of the 'rampart' which appear to have been survivals from the earlier or

pre-defence occupation. One of these (pl. XLII, 10) is comparable with pottery from the pre-Harappā layers at Amri, and, of the five sherds painted with neatly ruled horizontal black bands, one each is identical in shape with Nos. 14, 14*c* and 14*d*, while the remaining two are of similar fabric but are too fragmentary to show the shape. In a similar cutting further north, two exceptional sherds were also found in the make-up of the 'rampart' in the midst of pottery otherwise of the Harappā culture. One of these is identical in ware, shape and decoration with 14*c*, while the other, showing an analogous shape, is of a notably finer reddish buff fabric with an egg-shell polish on the outer surface and bears neatly ruled horizontal black lines (fig. 9, 33; pl. XLII, 11). The majority of the pottery is plain and shows characteristic Harappā shapes, such as R37, Types I, II, IV, VI, XI, XI*i*, XXII, XXXIII*e*, XLIV and Mackay Types D, F, AE, AC, W and X. The 'Indus goblet', which is particularly characteristic of the upper levels of the Harappā culture, is, perhaps significantly, conspicuous by its absence. A common feature of R37 Types XI and XXII, occurring in this group, is the presence of a dull yellowish slip on the lower exterior, which in the latter type is generally marked by a closely-combed wavy band (fig. 10, 34). Painted sherds are few and show familiar Harappā designs.

Figs. 9 and 10

33. Reddish buff fragment of beaker with egg-shell polish and carefully ruled horizontal black lines. See also pl. XLII, 11.

34. Vase (R37, Type XXII) with yellowish slip on the lower exterior and a band of combed pattern.

35. Carinated bowl with sagger-base, painted with two horizontal black bands, and with a rough cross in relief on the underside of the base.

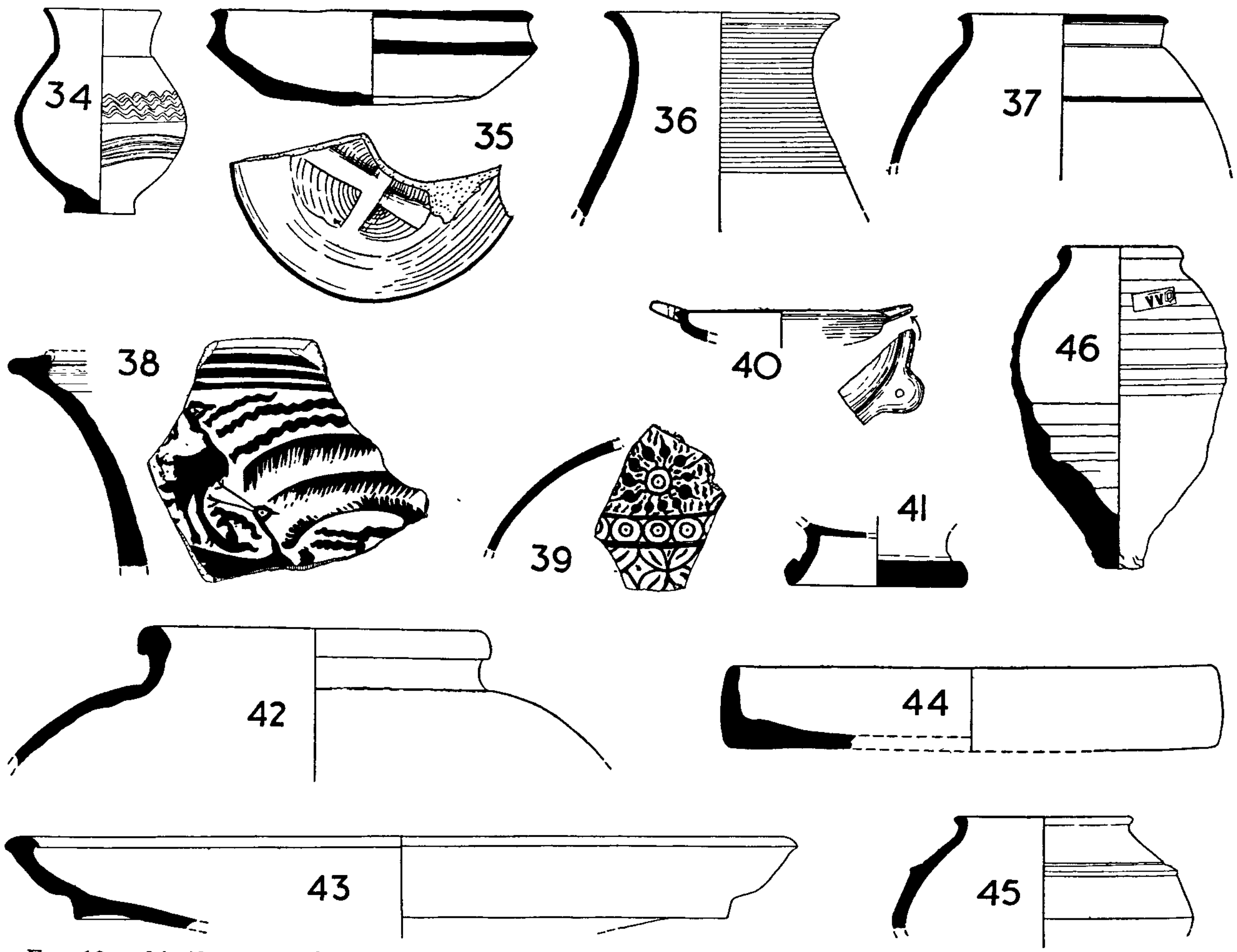


FIG. 10. *34–40, pottery from the defences; 41–45, pottery from the structural periods I–VI; 46, stamped goblet from a late layer* (see p. 120). $\frac{1}{4}$



Pottery from pre-defence deposits



Pottery from the mud-brick fortification and 'rampart'



1–9, pottery from the mud-brick fortification and 'rampart'; 9a, sherd from Periāno Ghuṇḍai; 10-11, sherds from the earthen make-up of the 'rampart'



Pottery from the earthen make-up of the 'rampart' and platform



Pottery from the earthen make-up of the 'rampart' and platform



'Cemetery H' pottery found beside fragmentary walls adjoining western gateway B

36. Fragment of a wide-mouthed beaker coated with yellowish slip on the lower exterior (below the horizontal lines which indicate a red surface on the drawing).
37. Fragment of a buff-slipped vessel of red ware, painted with simple horizontal bands.
38. Rim-fragment of a vessel (R 37, Type XLI) painted with peacocks and palm-fronds.
39. Sherd painted with intersecting circles, a row of concentric circles with dot, and a pattern consisting of *pipal*-leaves emanating like rays or petals from concentric circles (see also pl. XLIV, 5). A similar pattern occurs at Chanhu-daro in the Harappā levels (Mackay, *Chanhu-daro*, pl. XXXIII, 10 and 14).
40. Small shallow dish with perforated lug handle—a rare feature in Harappā pottery.

Pl. XLII

10. Sherd comparable in fabric and decoration with Amri ware.
11. Reddish buff fragment of beaker with egg-shell polish and horizontal black lines. See also fig. 9, 33.

Pl. XLIII

1. Rim-fragment of a vessel (R 37, Type XLI) painted with *pipal*-leaves.
2. Rim-fragment painted with criss-cross pattern.
3. Sherd painted with double row of vertical wavy lines and blade-shaped conventional leaf-pattern.
4. Sherd painted with bipinnate leaves and roundels with dots.
5. Sherd painted with the linked-ball motif.
6. Sherd painted with conventionalized plant-design.
7. Sherd painted with roundels and dots.
8. Sherd painted with comb-patterns and squares with dots.
9. Sherd painted with stars enclosed in lozenges.

Pl. XLIV

1 and 2. Sherds painted with intersecting-circle patterns.
3. Sherd painted with conventionalized plant-design.
4. Sherd painted with fish-scale pattern.
5. Painted sherd. See also fig. 10, 39.
6. Sherd painted with peacock-design.
7. Fragment of a vessel similar to R 37, Type XLI, bearing three fish in a vertical row.
8. Sherd painted with triangles and mat-pattern.

Pottery from the structural Periods I–VI on the platform (fig. 10, 41–45)

The pottery from the structural Periods I–VI (numbered from bottom to top) comes from a restricted area (20 feet × 18 feet) but is sufficient to indicate the presence of the Harappā culture in all layers. Two points may be noticed. First, painted vases are rare, and show only horizontal black bands. Secondly, the 'Indus goblet' (Mackay Type B and figs. 10, 46 and 13, III) is present in all the periods. The commonest shapes, occurring in all the periods, in an order of frequency, are the ribbed cooking-vessels, usually with a burnt exterior (Mackay Type F), storage-jars (R 37, Type XL), shallow dishes (Mackay Type W), cylindrical vases with thick flat bases (Mackay Type S), small cylindrical beakers (Mackay Type H), 'Indus goblets' (Mackay Type B), and jar-stands (Mackay Type AE).

From the restricted presence of certain specialized types, the following conclusions have been tentatively drawn with regard to the distinguishing traits of the structural periods:—

Thick hand-made dishes or lids with straight sides are confined to Periods I–III (fig. 10, 44), these being represented by three specimens in Period I and one each in the

other two. The dish-type flanged immediately above the base (fig. 10, 43), the jar with prominent ledged shoulder (fig. 10, 42), and a new variety of pedestal-base (fig. 10, 41) are confined to Period I.

Vessels analogous to Mackay Type D, No. 28, are very rare and come only from Periods I–III. A unique specimen of this type in grey ware occurs in Period III.

The only two examples of miniature offering-stands come from Period V, one of them painted with a rough circle-and-dot on the interior of the cup. Period VI shows, besides the usual type of cordoned cooking-vessel (Mackay Type F), a new variant of this type with a beaded rim (fig. 10, 45).

The following sherds are illustrated (fig. 10):—

41. Fragment of a painted pedestal-base. Period I.
42. Rim-fragment of a storage jar with a prominent ledged shoulder. Period I.
43. Shallow dish with a sharply restricted base. Period I.
44. Thick hand-made dish. Period I.
45. Ribbed cooking-vessel with a beaded rim. Period VI.

Pottery contemporary with the late fragmentary structures on the western terraces (pl. XLV)

This pottery is a mixed group from a layer contemporary with the late and fragmentary buildings on the western terraces (above, p. 74). The group includes, with true Harappā wares,[1] a considerable percentage of the wares characteristic of both strata of the alien Cemetery H. These Cemetery H sherds are of importance as the first found in association with structures. They comprise fragments of a straight-necked jar painted with the ladder-pattern (pl. XLV, 1); jar-covers (Vats, op. cit., pl. LX, 3) of Stratum I type; flasks (Vats, Type G); platters (Vats, Type M) painted on the underside with a row of triangles (pl. XLV, 7, 8); and stumpy dish-on-stands (Vats, pl. LX, 21) of Stratum II type. The decorative designs on sherds of this group include stars (pl. XLV, 2, 3, 4, 6), bird's heads (pl. XLV, 5), and possibly a peacock (pl. XLV, 10), all of which are common to both strata of Cemetery H.

(*b*) POTTERY FROM THE CEMETERY AREA[2]

For the study of the pottery found in the cemetery area in 1946, the stratification may be grouped from bottom to top into five series:—

(i) Layers underlying Cemetery R 37.
(ii) Cemetery R 37.
(iii) Layers immediately sealing Cemetery R 37.
(iv) Débris-layers over (iii).
(v) Cemetery H.

(*i*) *Pottery from layers underlying Cemetery R 37*

The few sherds, invariably plain, from the pre-cemetery layers belong to R 37, Types I, III, IV, XI, XVII and XXXIX. It is noteworthy that it included only one fragmentary base of the Indus goblet (R 37, Type III) which occurs in such profusion in the upper levels

[1] The Harappā types in this group include Mackay Types A, E, F and S; R 37 Type VI*a*; and bases of vessels analogous to Mackay, pl. LXV, 48.

[2] The pottery from the cemetery-area has been classified by Mr. Krishna Deva and Mr. S. C. Chandra.

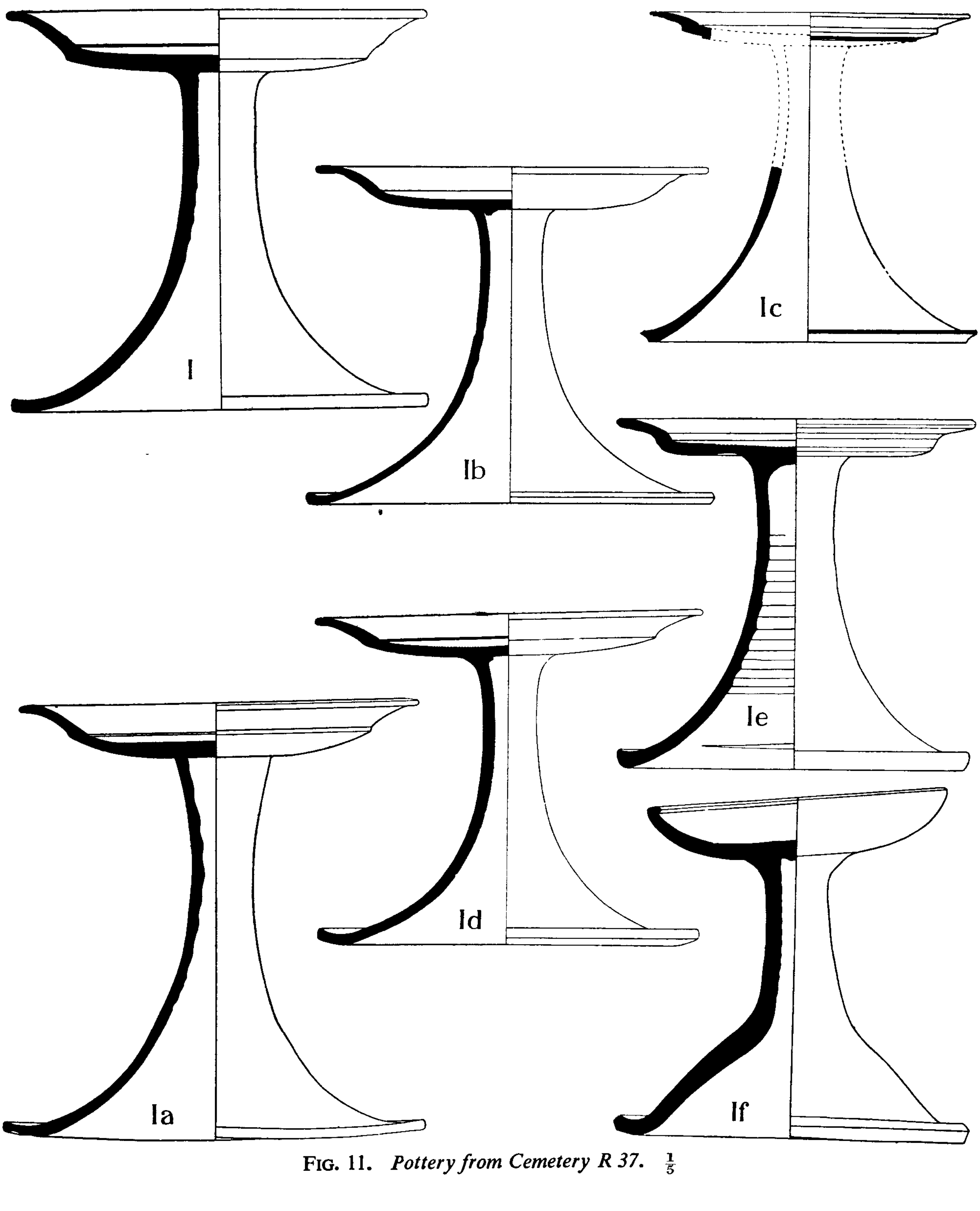


FIG. 11. *Pottery from Cemetery R 37.* $\frac{1}{5}$

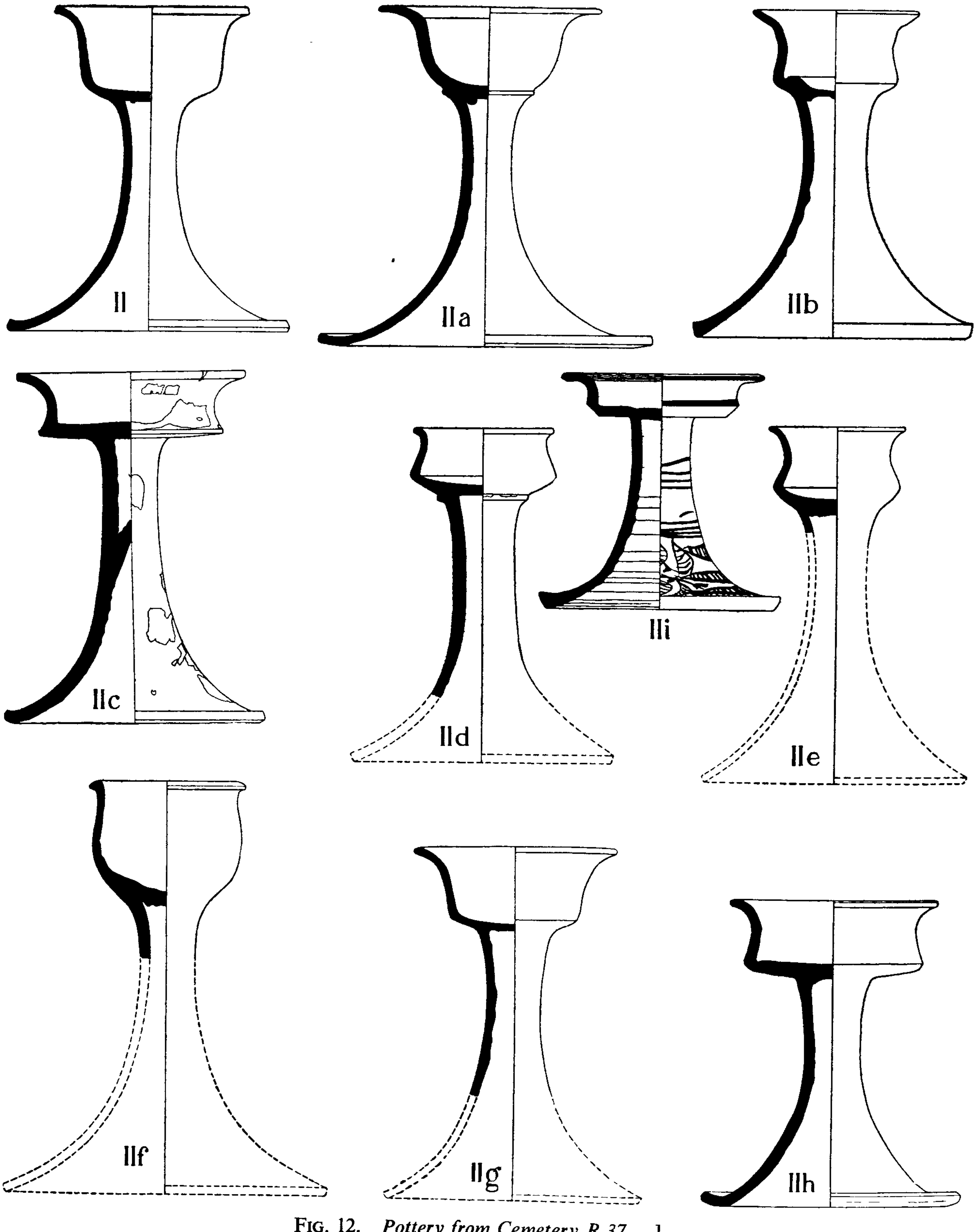


FIG. 12. *Pottery from Cemetery R 37.* $\frac{1}{5}$

of the habitation-areas and forms the bulk of the pottery from the débris overlying Cemetery R 37.

This pottery has nothing in common with the early pre-rampart wares from cutting HP XXX (above, p. 91) and, like the Cemetery R 37 pottery, belongs substantially to the mature Harappā culture.

(*ii*) *Pottery from Cemetery R 37*

In this section, all the pottery found in Cemetery R 37 from 1937 to 1946 is considered together. It represents the mature Harappā ceramic, and overlaps show that the types are contemporary with one another. They are for the most part plain and utilitarian in character, with more than a hint of mass-production. The clay used is usually coarse and not well-levigated. The ware is wheel-turned, well-baked, thick and sturdy, and has a pale red slip. Unlike the Cemetery H pottery, which is extensively and sometimes elaborately painted, the few painted specimens from R 37 (invariably in black paint) show a strong bias towards geometric and linear patterns, identical with those from the habitation-areas. A notable feature is the presence of a thick white slip of gypsum,[1] which flakes off easily on exposure. Most of the medium and small vases and especially the medium ledge-necked jars (Type R 37, IX) bear traces of paring and trimming with a sharp-edged instrument, and the dull white slip on the body is often combed horizontally. These rough horizontal combings give the effect of 'reserved slip', allowing the original body of the pot to show through with some sort of decorative effect.

The burial-pottery forms a large collection and shows a wide range of shapes and sizes, most of which are represented in the mounds and Area G at Harappā, although a few are new. Shapes not represented in the habitation-areas either at Mohenjo-daro or Harappā are vase-types V, VII, VIII, XII, XV, XIX and XXXV; cylindrical beaker-types XXVIII and XXIX; and casket-types XXXVI–XXXVIII. The absence of Types XII, XV, XIX and XXXV from the habitation-areas may not, however, be significant, as these types are extremely rare even in R 37. Type III which is found in great abundance in the habitation-areas, is rare in R 37 where it is devoid of the scored exterior which is a normal feature of this type. On the other hand Type II (cup-on-stand) is commoner in R 37 than

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[1] The Chemist of the Archaeological Survey of India reports as follows:—

The white layer carries under it a reddish brown coating of a crystalline substance. The specimen of the white slip was prepared by carefully scraping off the lower film. The analysis is as follows:—

Insoluble (clay, sand, etc.)	0·46
CaO	32·70
SO_3	46·65
Combined water	20·34
TOTAL	100·15

The amount of gypsum corresponding to 46·65% of sulphur trioxide is 100·3%. It is, therefore, clear that the white slip is composed of gypsum only. The analysis given above is in close agreement with the analysis of fairly pure gypsum.

The reddish brown coating was found to be free from nitrogenous matter and gave a negative test for gum and carbohydrates. It is, therefore, clear that no organic binding medium is present. A carefully prepared specimen of this substance showed transparent crystals under the microscope. On gentle ignition, the red colour disappears and the substance becomes opaque. Chemical analysis showed that the substance is gypsum containing a small amount of iron-oxide, which accounts for the colour. Some organic binding medium may have been originally present but apparently it has completely perished. The porous condition of the brown coating supports this view.

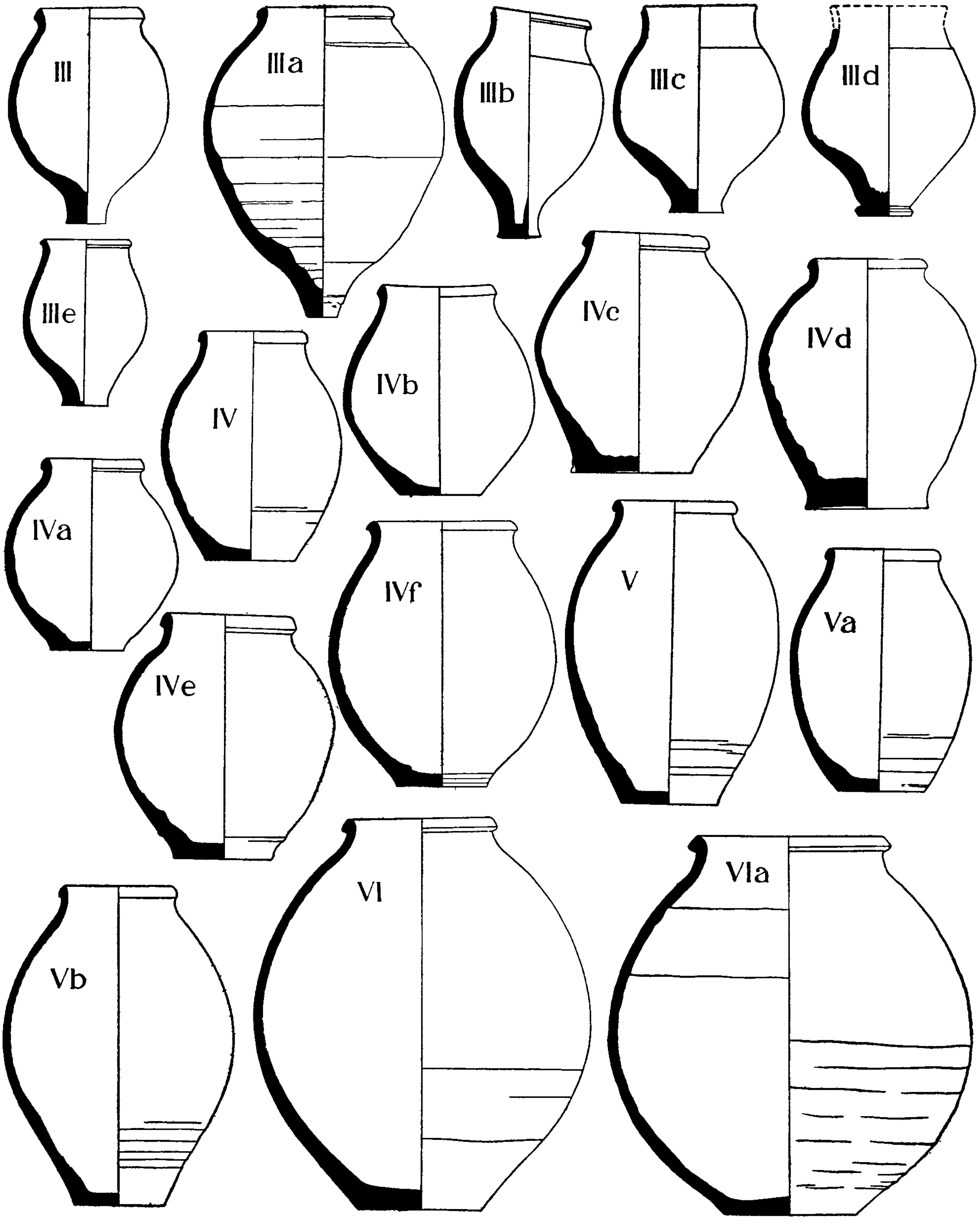


FIG. 13. *Pottery from Cemetery R 37.* 1/4

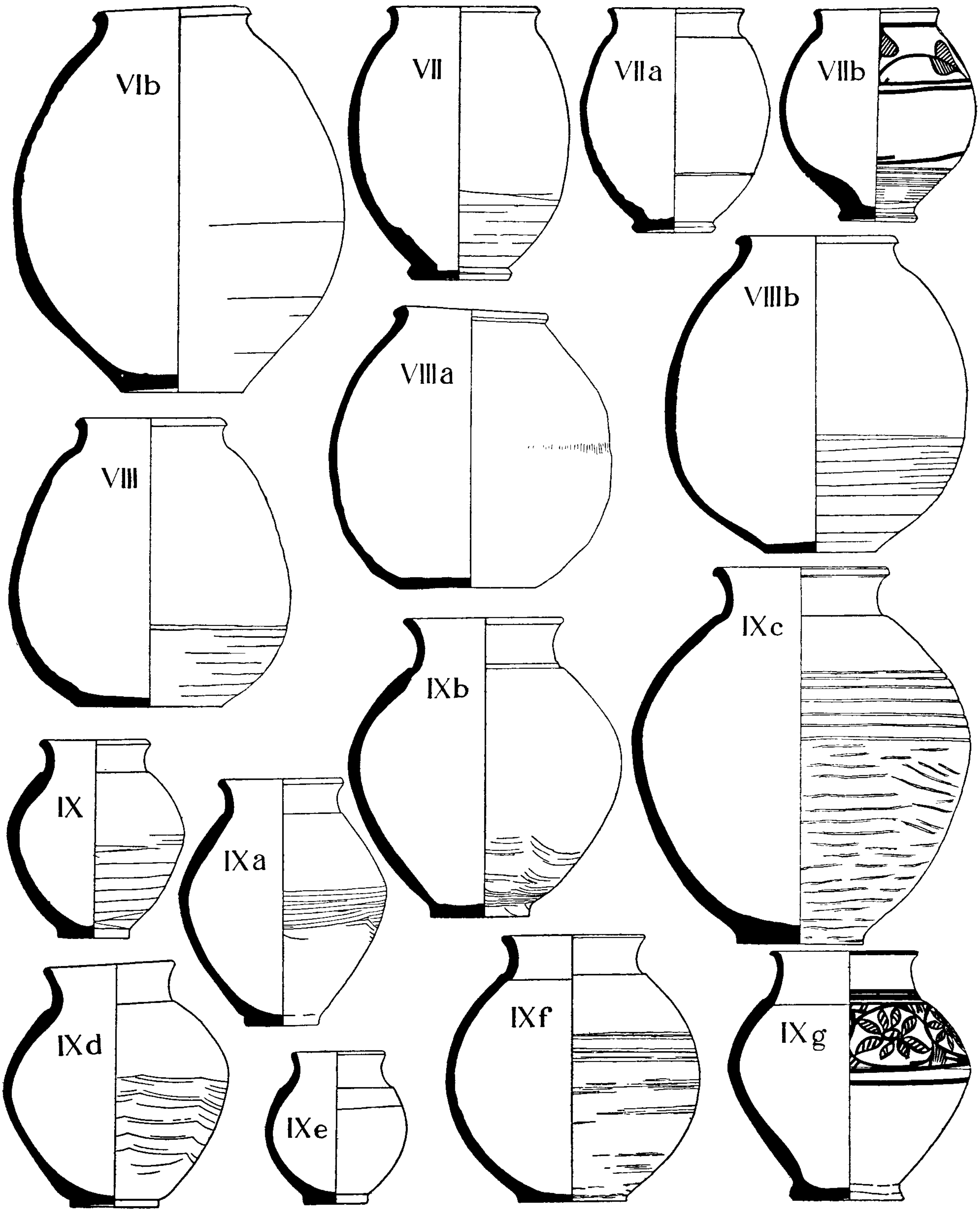


FIG. 14. *Pottery from Cemetery R 37.* $\frac{1}{4}$

in the habitation-areas. It may further be noted that some specialized shapes of R 37, such as Types XIII, XVII, XXVII, XXVIII and XLII, are present in Area G at Harappā but are either extremely rare on, or absent from, the habitation-areas.

The commonest types in order of frequency are Types XXX–XXXII, IX, XVII, XXVII, XXII, XVIII, IV, I, XXIII, XXVIII, XX, XIV, XIX, II, XI, XXXIII, XXI, XL. The following is a description in a serial order:—

Type R 37-I (Mackay Type A) is an offering-stand having a long plain stem with a broad base and a flat carinated dish. Variant I*a* deviates from the type in having a curled-up edge to the base. Variant I*b* has a less angular dish with smoother and thinner sides and stem. Variant I*c* has a shallow dish with sharply angular sides and is decorated with a thick black line on the outside. Variant I*d* differs from the main type in that the dish has incised concentric circles on the interior. Variant I*e* has a dish with widely flared mouth and incised concentric circles on the interior. Variant I*f* is distinguished by a dish having slightly incurved sides, an internally beaded rim and a thicker stem.

This type with its variants is common in the habitation-areas both at Mohenjo-daro and Harappā.

Type R 37-II (Mackay Type A) is an offering-stand with a long plain stem crowned by a cup or bowl. The bowl is characterized by almost straight sides and a slightly flared mouth. Variant II*a* has a more rounded bowl, a widely flared lip, and a ridge at the junction of the bowl and the stem. Variant II*b* has a bowl with concave sides. Variant II*c* has a bowl with pronouncedly concave sides and a flat base. It is unique in having a partition in the hollow stem and a coating of whitish paste. Variant II*d* has a carinated bowl with a pronounced ridge at the junction of the base with the stem. Variant II*e* has a deep bowl with sharp carination. Variant II*f* has a deep bowl with a short everted rim. Variant II*g* differs from the principal type in having slightly carinated sides. Variant II*h* generally resembles II*c* in the shape of the bowl, but has a stunted stem. Variant II*i* is unique in being painted with chains of loops on the interior of the flared rim and with conventional plant designs on the base (pl. XLVI, 2).

This type with its variants is rare in the habitation-areas of Mohenjo-daro and Harappā.

Type R 37-III (Mackay Types B and K)[1] is a goblet with a pointed base and with wheel-grooves both inside and outside. It is normally about six inches in height. Variant III*a* is larger and more pear-shaped and has a grooved shoulder. Variant III*b* is an elongated waster. Variant III*c* resembles the main type in height and general profile but has a thinner and less prominent rim and a slightly wider base. Variant III*d* has a ledge on the neck and a beaded base. Variant III*e* is smaller in size than the archtype and has a wider foot.

These pointed goblets occur in abundance in the upper levels of the habitation-areas both at Mohenjo-daro and Harappā, and their usually rough and crude make, together with their abundance, indicates that they were the customary drinking-vessels of the period and were possibly thrown away after being used once. Those from the cemetery show a better make and are devoid of the scored exterior which is a common feature of the Harappā vessels.

Type R 37-IV (Mackay Type G) is a medium-sized oval jar distinguished by a beaded rim and a flat, sometimes slightly concave, base. It has traces of wheel-grooving both inside and outside. Variant IV*a* is squatter and smaller in size, with a restricted base, while variant IV*b* has a pronouncedly bulging profile. Variants IV*c–d* deviate from IV*b* in having a thickened base. Variant IV*e* has an emphatic bead-rim and is characterized by a ridge or cordon near the base, while variant IV*f* has an undeveloped rim.

This type with its variants occurs in the habitation-areas both at Mohenjo-daro and Harappā.

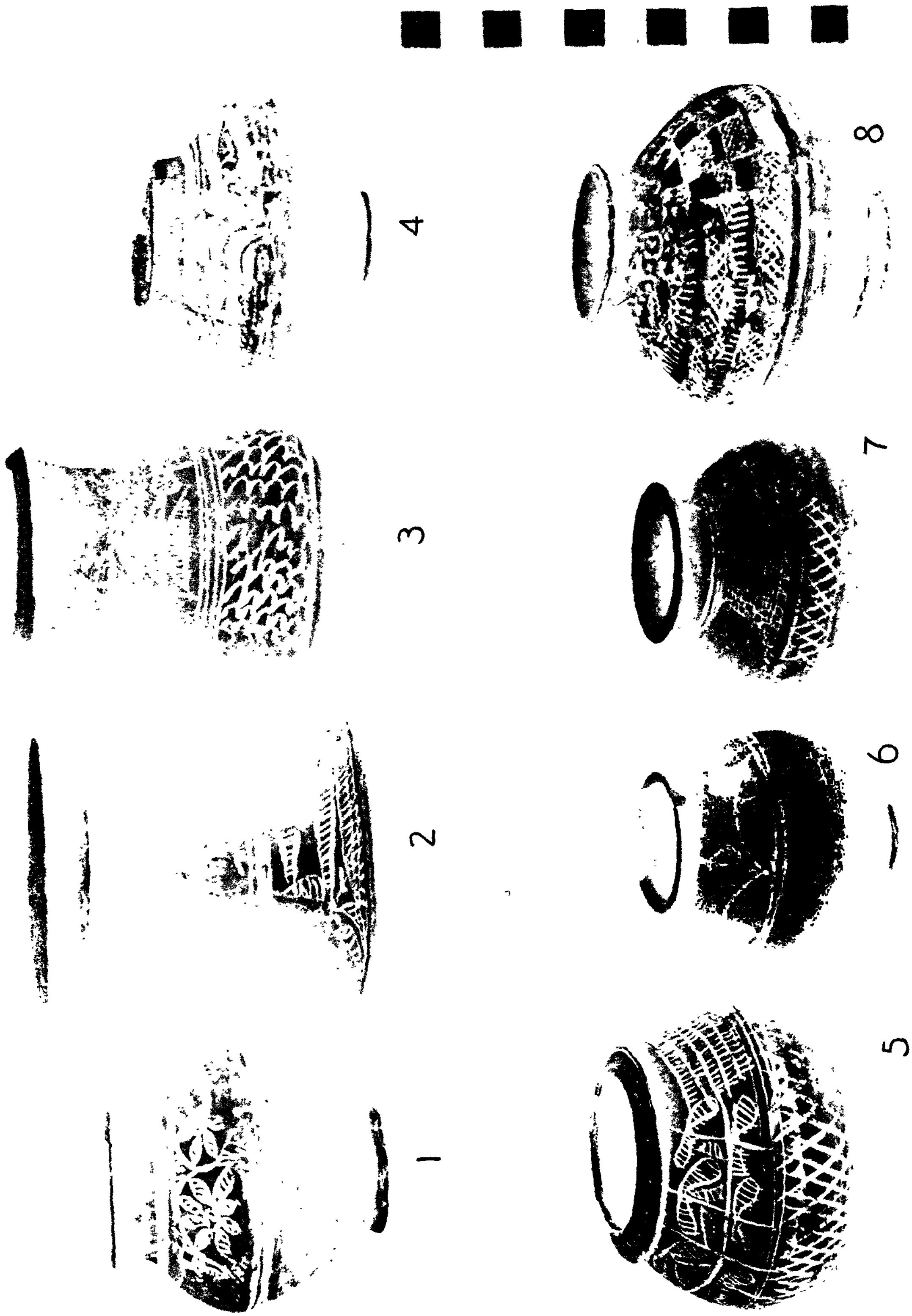
Type R 37-V is a barrel-shaped jar with bead-rim and flat base. The sides are wheel-grooved internally and externally. Traces of paring and trimming are evident on the lower exterior. Variant V*a* is smaller than the principal type and the wheel-grooves on the body are less prominent, while variant V*b* has a wider bulge in the middle. A new type.

Type R 37-VI is a tall oval jar with a comparatively narrow mouth, very short neck and wide shoulders. It is characterized by a slightly everted or beaded rim and flat base. Variant VI*a* has a more bulging body, with traces of paring and trimming on the lower outer surface, while variant VI*b* is characterized by an everted rim and slightly concave base.

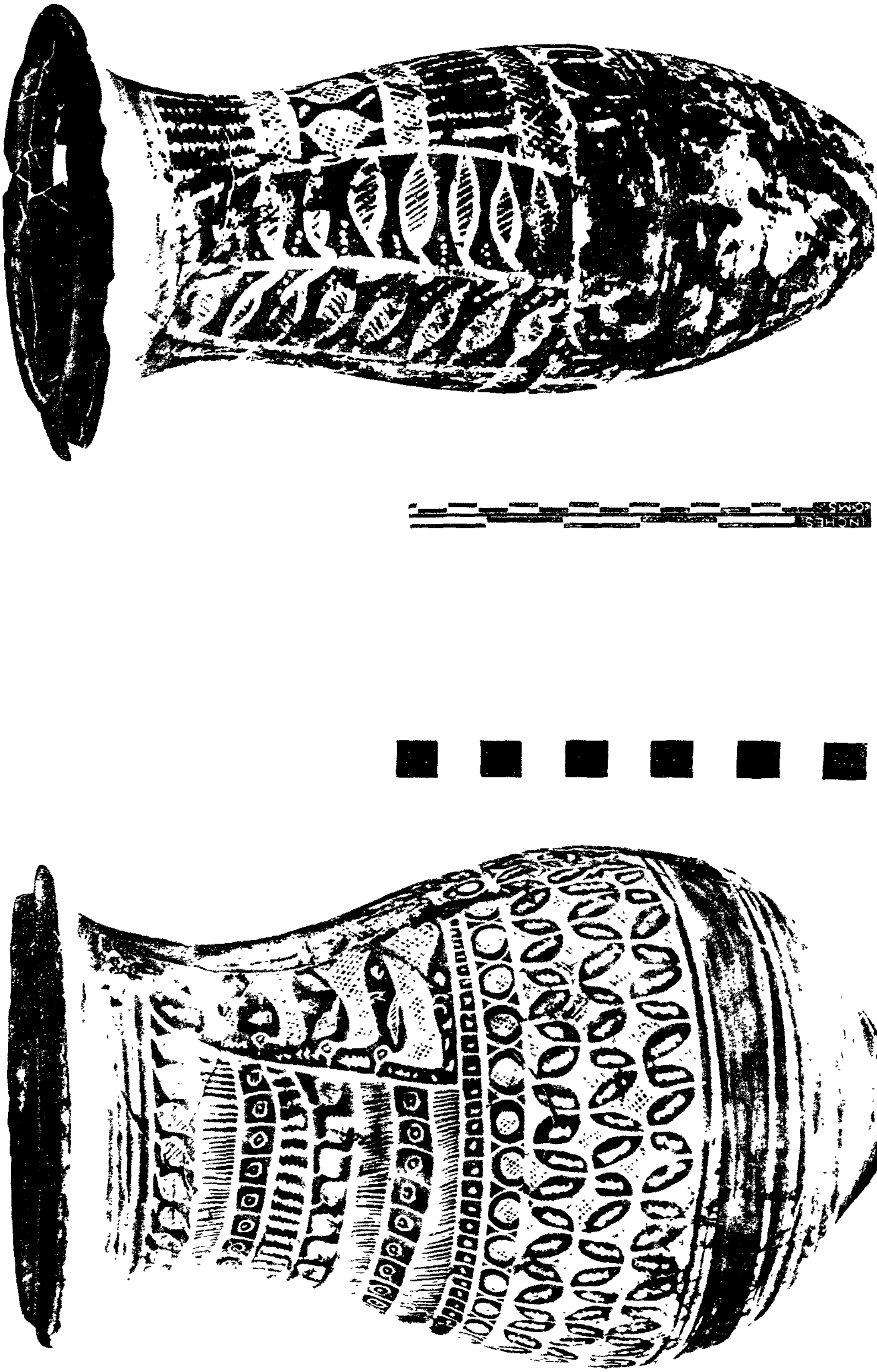
This type with its variants is represented in the habitation-areas at Mohenjo-daro and Harappā.

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[1] The pointed goblet, so common in the habitation-areas at Harappā, is conspicuous by its absence from the intrusive Cemetery H culture.



Pottery from Cemetery R 37, types IXg, IIi, XLId, XIf, XIIIa, VIIb, XIh and XIg
(Scale of inches)



B

A

Pottery from Cemetery R 37, types XLIa and c
(*Scale of inches*)

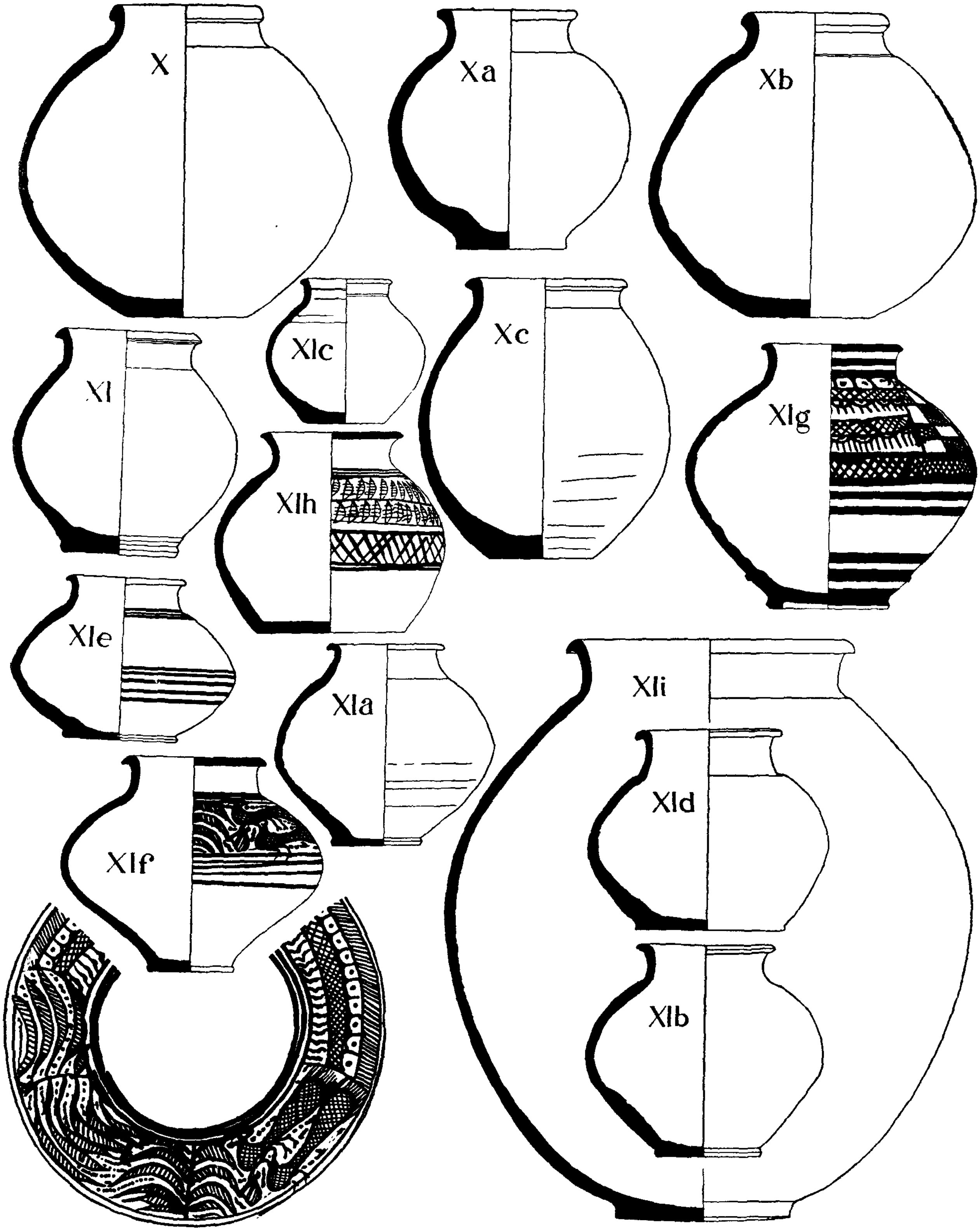


FIG. 15. *Pottery from Cemetery R 37.* ¼

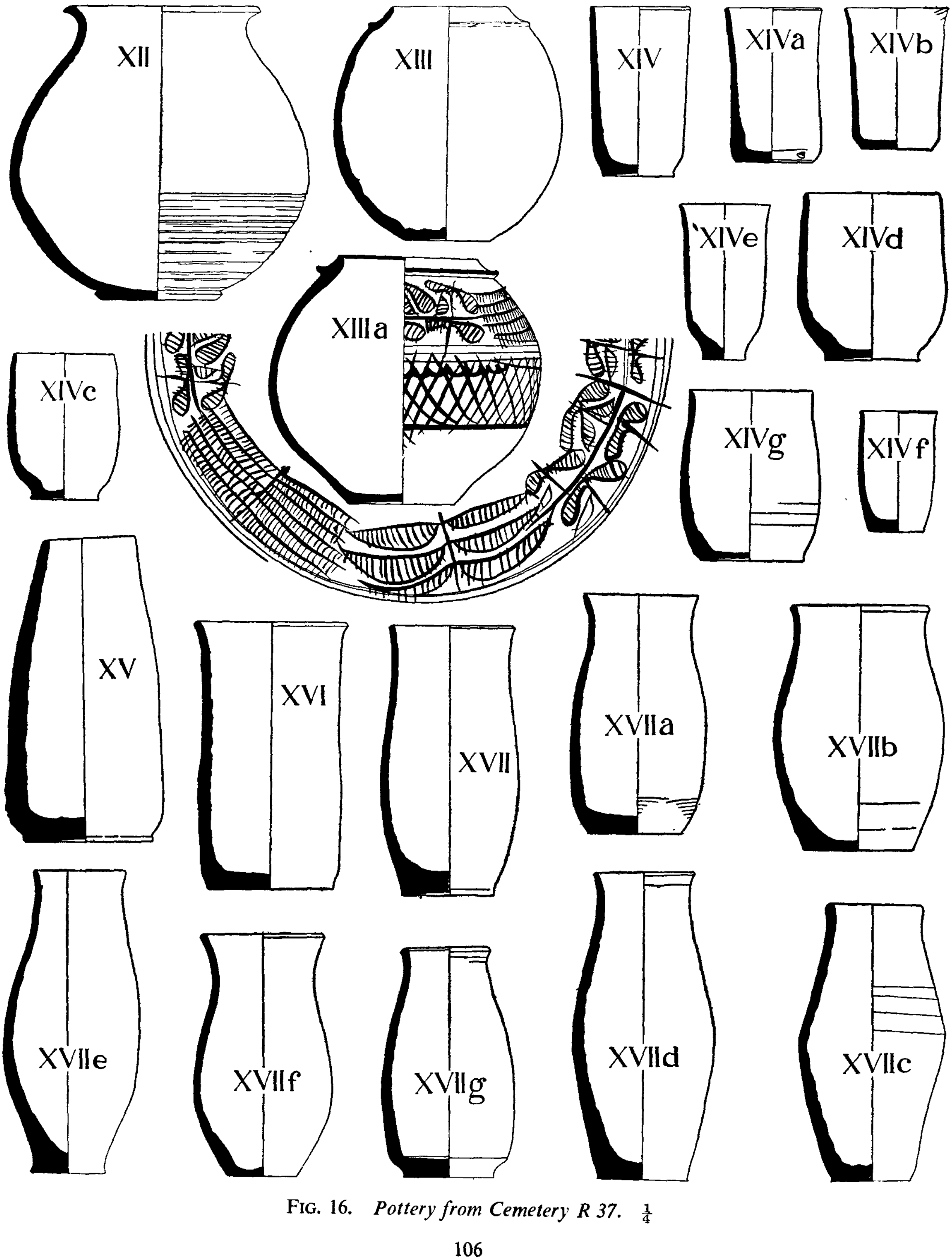


FIG. 16. *Pottery from Cemetery R 37.* $\frac{1}{4}$

Type R 37-VII is an oval jar marked by a beaded concave base, short neck and slightly everted rim. Its lower exterior is usually pared and trimmed with a sharp-edged tool. Variant VII*a* is thinner and smaller, and variant VII*b* is squatter, than the main type. The specimen of VII*b* illustrated is unique in having a painted band in black of *pipal*-leaf pattern, which is the commonest of the Indus plant-motifs (pl. XLVI, 6). A new type.

Type R 37-VIII is a roughly potted ovoid vessel with short neck and wide flat base. Variant VIII*a* has wider shoulders and no neck, while VIII*b* has a restricted base. A new type.

Type R 37-IX (Mackay Type G) is a small oval jar characterized by a ledged shoulder, flat base and trimmed exterior. Variant IX*a* has a slightly carinated side with prominent scores round the middle, while IX*b-c* are progressively larger variants of the archtype. Variant IX*d* deviates from the type in having a slightly concave base. Variants IX*e-f* are marked by a pronounced ledge at the shoulder, while IX*g* has a beaded base and is painted in black with a series of circumscribed flowers in horizontal bands (pl. XLVI, 1).

This type is very common in the habitation-areas both at Mohenjo-daro and Harappā.

Type R 37-X (Mackay Type E) is a bulbous ledge-necked jar with a clubbed rim. Variant X*a* is smaller and has a wider rim and thicker sides, incurved towards a thick flat base. Variant X*b* deviates from the main type in having a wider bulge. Variant X*c* is distinguished by a thick beaked rim, flat base and thick sides.

This type with its variants is common in the habitation-areas both at Mohenjo-daro and Harappā.

Type R 37-XI (Mackay Type E) is a ledge-necked bluntly carinated vessel with beaked rim and beaded base. Variant XI*a* has a voluted rim and internal wheel-grooves. Variant XI*b* has a straight beaked rim. Variant XI*c* is smaller in size with an inconspicuous beak. Variant XI*d* is squatter and has a prominent everted rim and a wider base. Variant XI*e* is even squatter than XI*d* and bears painted black bands round the neck and body. Variant XI*f* tapers considerably down towards a narrow beaded base and is unique in bearing a painted band consisting of peacocks, bipinnate leaf and mat-patterns (pl. XLVI, 4). Variant XI*g* is a unique pot with prominent ridge above a ring-base. It is decorated in black with two rows of dotted loop pattern with vertical pendants, chess-board and mat-designs and horizontal bands (pl. XLVI, 8). Variant XI*h* has a broad base and is unique in bearing roughly painted horizontal bands of trellis and conventional hatched leaf-patterns (pl. XLVI, 7). Variant XI*i* is a large jar with undercut rim and prominent base.

This type is common in the habitation-areas both at Mohenjo-daro and Harappā.

Type R 37-XII, one example, is a pear-shaped vessel with a flared lip and beaded base. It is grooved both internally and externally. The lower outer surface is sharply pared and bears traces of horizontal combing. A new type.

Type R 37-XIII, one example, is a globular vessel with a flange round the neck (evidently to receive a lid), a slightly concave base and internal wheel-grooves. Variant XIII*a*, one example, has rounded sides, with its greatest width well below the middle of the body. It is characterized by an accentuated flange and is roughly painted in black with the conventional *pipal*-leaf, palm-frond, loop and mat-patterns (pl. XLVI, 5).

This type occurs in the habitation-areas at Harappā but not at Mohenjo-daro.

Type R 37-XIV (Mackay Types C and H) is a cylindrical beaker, smooth outside but wheel-grooved inside, and with a slightly concave base. Variant XIV*a* differs from the main type in having a slightly concave profile and flat base. Variant XIV*b* is thinner than XIV*a* and has a slightly flared rim and a base with trimmed edge. Variant XIV*c* is distinguished by restricted concave sides towards the base. Variant XIV*d* is squatter and broader than XIV*c*. Variant XIV*e* has a markedly restricted base, while XIV*f* tapers down towards the base. Variant XIV*g* is a broader vessel with a tendency to develop a neck.

This type with its variants is exceedingly common, especially in the upper levels, both at Mohenjo-daro and Harappā.

Type R 37-XV is a unique elongated cylindrical vase with a featureless rim and sides slightly tapering towards the mouth. It is characterized by thick, unsmoothed sides and a slightly concave base. Inside are prominent wheel-grooves. A new type.

Type R 37-XVI is a cylindrical vase with a slightly flaring lip and a wide flat base. Inside are prominent wheel-grooves. Analogues of this type occur occasionally both at Mohenjo-daro and Harappā.

Type R 37-XVII is a rimless elliptical vase with a flat or slightly concave base. The outer side is comparatively smooth but the inner side is heavily wheel-grooved. Variant XVII*a* is characterized by a thick flat base and a slightly flared mouth. Variant XVII*b* has a markedly bulging profile with a wider base, the diameter at the mouth being almost equal to that at the base. Variant XVII*c* is biconical with a flat base. Variant XVII*d* differs from XVII*c* in having a slightly flared rim. Variant XVII*e* is marked by a pronouncedly restricted base. Variant XVII*f* has a conspicuously flared rim. Variant XVII*g* has sides tapering up towards the mouth.

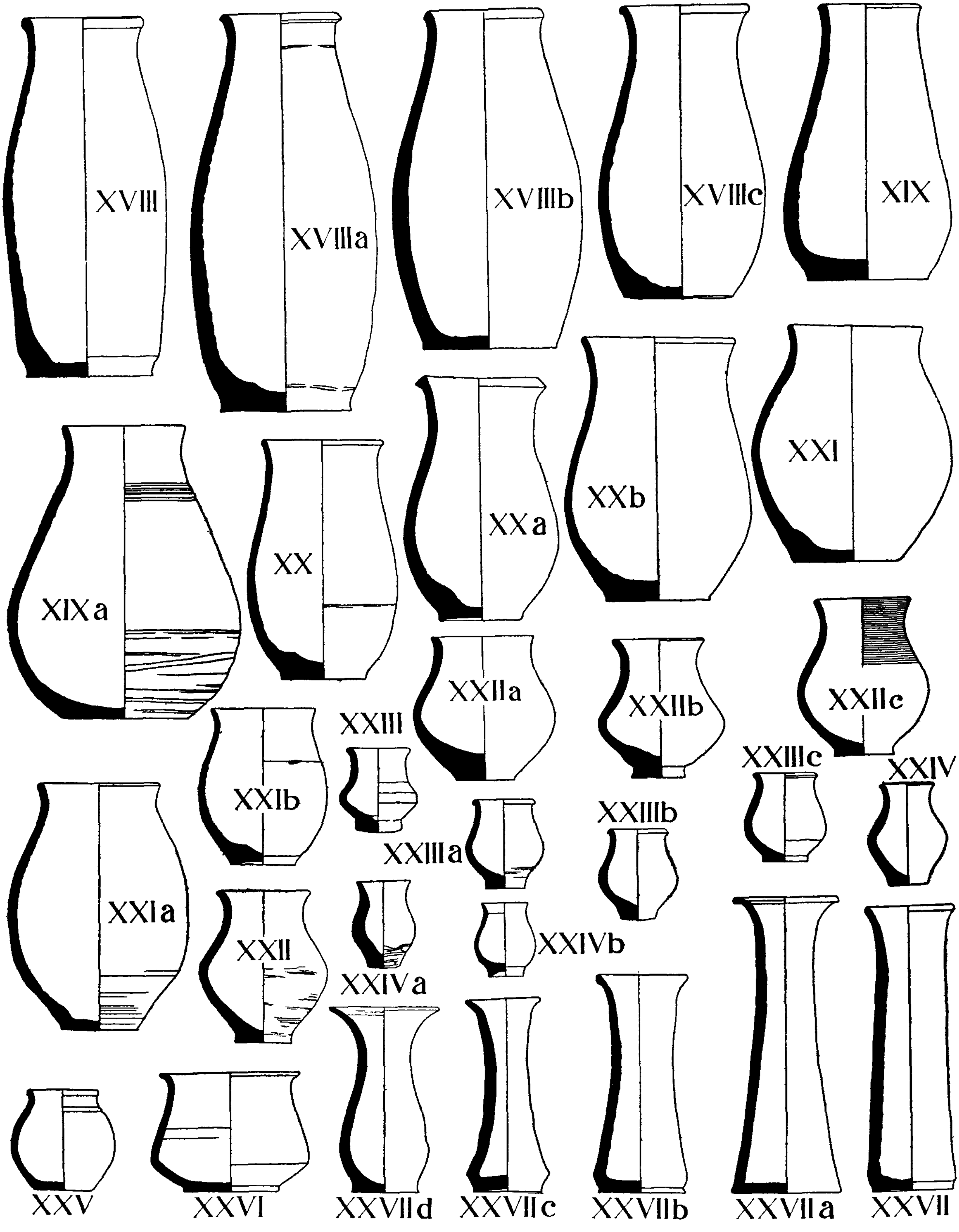


FIG. 17. *Pottery from Cemetery R 37.* ¼

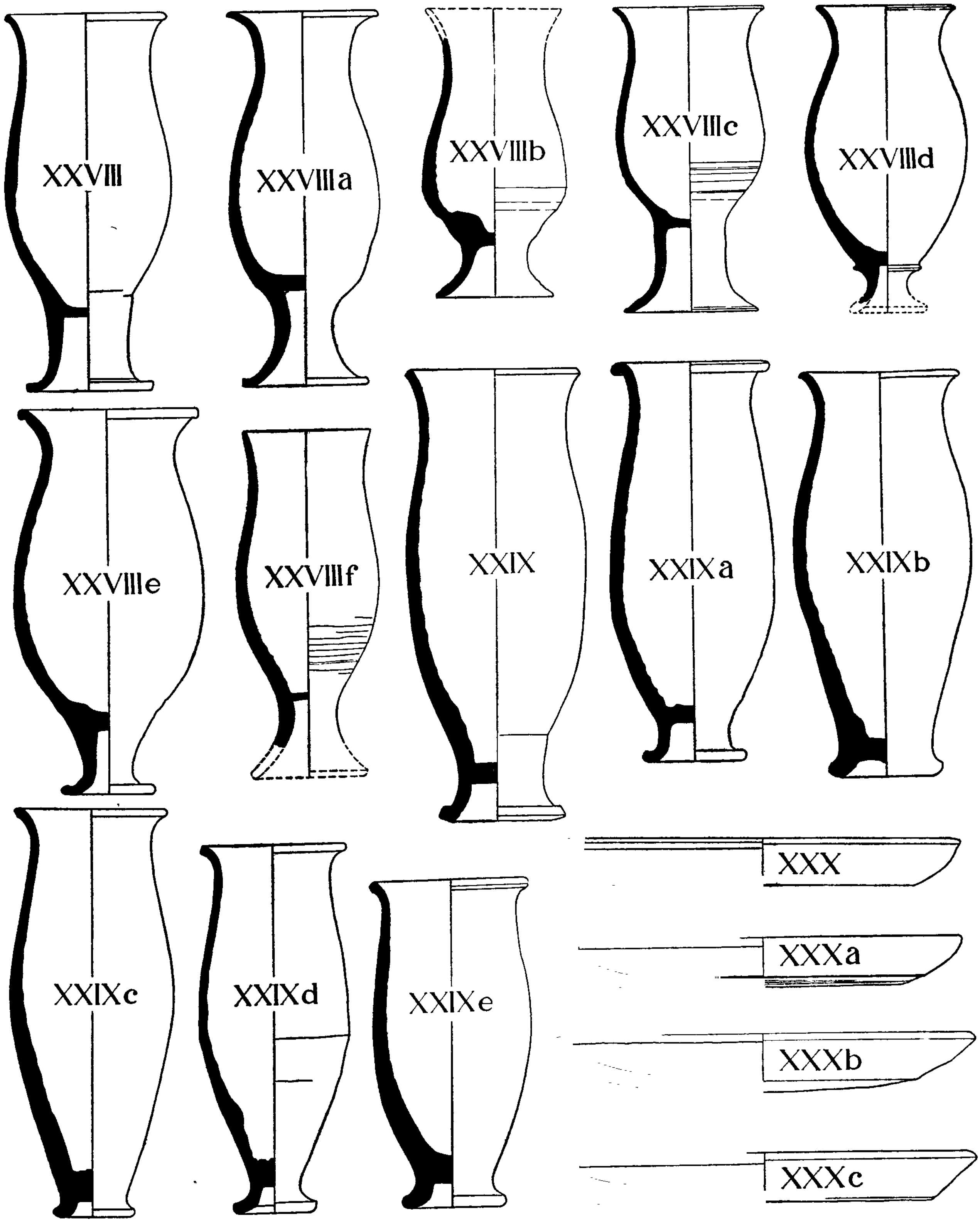


FIG. 18. *Pottery from Cemetery R 37.* $\frac{1}{4}$

This type is rare at Mohenjo-daro and is represented only in area G at Harappā.

Type R 37-XVIII (Mackay Type Z) is an elongated bottle-shaped vase with bead-rim and sides slightly incurved towards a flat base; outside smooth, inside wheel-grooved. Variant XVIII*a* has a bulging profile and an everted rim. Variant XVIII*b* has a barrel-shaped body and lacks the inner wheel-grooves of the archtype. Variant XVIII*c* is smaller and has a less abrupt restriction towards the base.

This type with its variants is rare at Mohenjo-daro and Harappā, occurring only in the late occupation-levels.

Type R 37-XIX is a long pear-shaped vase with an unemphatic bead-rim and a wide flat base. The inner side has prominent wheel-grooves. Variant XIX*a* is unique in having a pronouncedly bulging profile and a multi-grooved shoulder. The lower exterior of the vase has been trimmed by a sharp instrument. A new type.

Type R 37-XX (Mackay Type C) is a medium-sized vase with convex profile, slightly flared mouth and sides incurving towards a flat base. This type resembles in general profile the vessel used on the Persian water-wheel, widely prevalent today in the Punjab and Sind. Variant XX*a* deviates from the archtype in having a beaked rim, thicker walls and a concave base. Variant XX*b* is broader than the main type.

This type with its variants is common in the habitation-areas both at Mohenjo-daro and Harappā.

Type R 37-XXI is a *loṭā*-shaped vase with a slightly flaring rim and flat base. Variant XXI*a* has an elongated profile which is restricted towards the base. Variant XXI*b* is smaller and deviates from the main type in having a concave base.

This type with its variants is present in the habitation-areas both at Mohenjo-daro and Harappā.

Type R 37-XXII (Mackay Type G) is a small vase with spreading mouth and somewhat emphatic base. This type was almost invariably trimmed with an edged instrument, sometimes as high as the middle of the body but usually on the lower portion only. The presence of a dull white slip is very often noticeable, generally below the shoulder. Variant XXII*a* deviates from the main type in having a more generalized form and a thicker base. Variant XXII*b* has a bulging girth and a pronounced base. Variant XXII*c* is distinguished by a series of regular horizontal combings, which allow the body of the ware to show through the coating of white slip.

This type with its variants is very common in the habitation-areas both at Mohenjo-daro and Harappā.

Type R 37-XXIII (Mackay Type G) is a bell-shaped miniature vase with a flat band round the middle of the body and a thick flat base. The lower portion of the body shows traces of paring and trimming. Variant XXIII*a* has a voluted rim, while XXIII*b* has a beaked one. Variant XXIII*c* has a beaded rim.

This type with its variants is common in the habitation-areas both at Mohenjo-daro and Harappā.

Type R 37-XXIV (Mackay Type G) is a miniature vase with a flared rim and thick flat base. Variant XXIV*a* has a featureless rim and thick walls, with traces of heavy paring. Variant XXIV*b* is characterized by thin walls and a pronouncedly concave base.

This type with its variants is common in the habitation-areas both at Mohenjo-daro and Harappā.

Type R 37-XXV, one example, is a miniature vase with rounded sides, a bead-rim, grooved shoulder and wide flat base. Analogues of this type with a narrower base occur occasionally both at Mohenjo-daro and Harappā.

Type R 37-XXVI, one example, is a squat carinated vase with flared lip and beaded base. This type is rare in the habitation-areas at Mohenjo-daro and Harappā.

Type R 37-XXVII (Mackay Type C) is a tall, slender cylindrical vase with a flat or slightly concave base and a slightly flared rim. The sides are fairly smooth and tapering towards the mouth. Variant XXVII*a* deviates from the main type in having a widely flared mouth and an elongated base. Variant XXVII*b* is characterized by concave sides with a sharp carination near the base and a greater flare of the lip. Variant XXVII*c* deviates from XXVII*b* in being attenuated in the middle. Variant XXVII*d* differs from the principal type in having a graceful concave profile with a slight bulge towards the base.

This type with its variants is not represented at Mohenjo-daro and occurs only in Area G at Harappā.

Type R 37-XXVIII is an elliptical vase with a graceful convex profile, a flared mouth and a hollow pedestal-base. Variant XXVIII*a* has a more flared mouth than the main type, while XXVIII*b* has a bulged profile. Variant XXVIIIc deviates from XXVIII*b* in having a taller pedestal. Variant XXVIII*d* has a pronouncedly convex profile and is unique in being beaded at the junction of the body and the pedestal. Variant XXVIII*e* is broader and has a beaded and flared rim. Variant XXVIII*f* is the only example of a rimless, footed, elliptical vase.

This type with its variants is not represented at Mohenjo-daro and occurs only in Area G at Harappā.

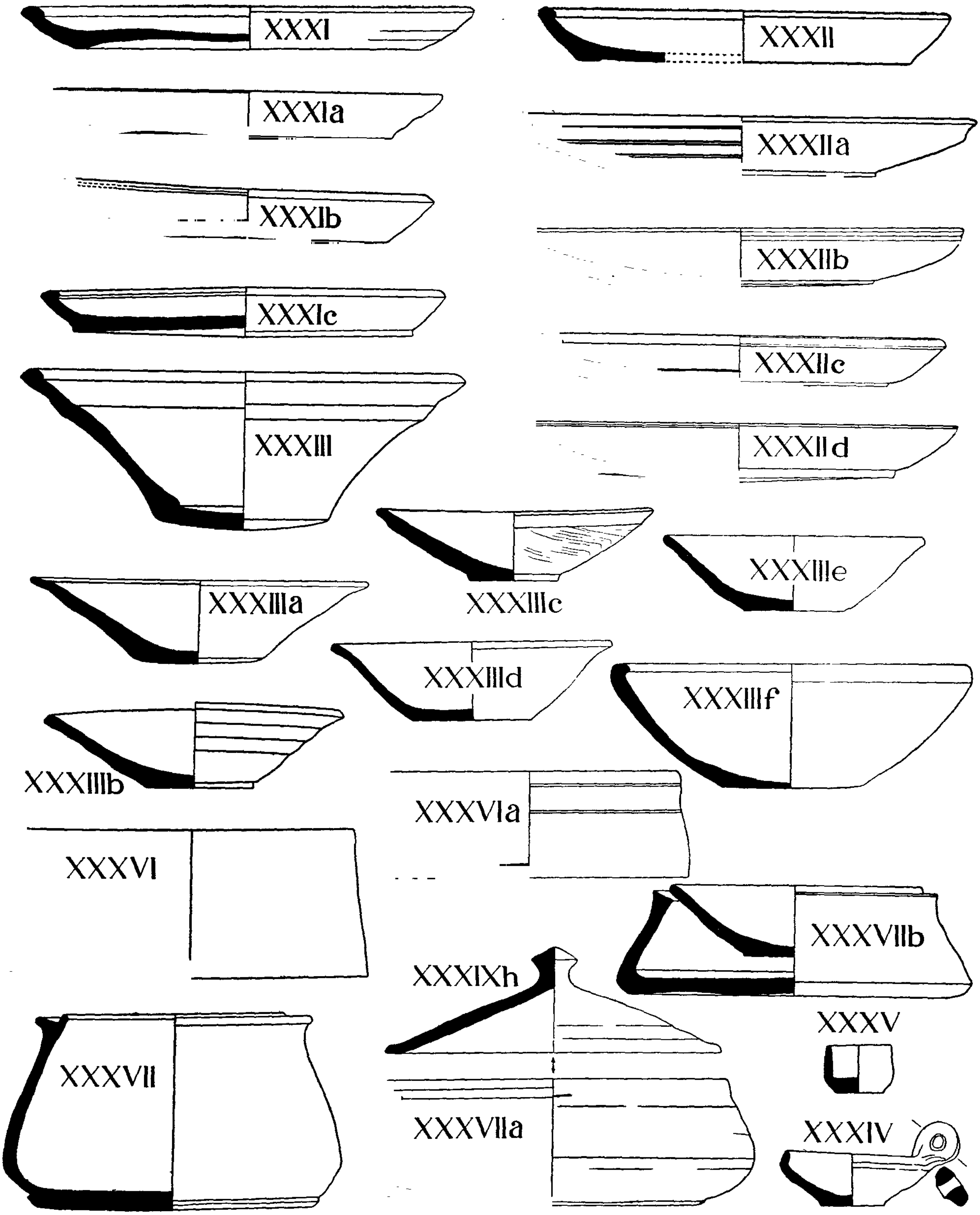


FIG. 19. *Pottery from Cemetery R 37.* $\frac{1}{4}$

Type R 37-XXIX is an elongated elliptical vase with a slightly splayed mouth and a short pedestal-base. Variant XXIX*a* has a rolled rim, while variant XXIX*b* has a more flared rim. Variant XXIX*c* is distinguished by a beaded rim. Variant XXIX*d* is smaller and thinner than the main type, while XXIX*e* is markedly squat. A new type.

Type R 37-XXX (Mackay Type W) is a shallow dish with an incurved rim. Metal dishes of similar shape are used today in India for kneading dough.[1] Variant XXX*a* has prominent external grooves towards the base. Variant XXX*b* has a thick rim and a slightly rounded base. Variant XXX*c* has an internally clubbed rim.

This type far outnumbers every other type of pottery found in Cemetery R 37 and is also very common in the habitation-areas at Harappā, though rare at Mohenjo-daro.

Type R 37-XXXI (Mackay Type W) is a shallow dish with thick internally beaded rim, corrugated sides and pronouncedly concave base. Variants XXXI*a*, *b* and *c* differ in the shape of the rim.

This type with its variants is common in the habitation-areas at Harappā, but rare at Mohenjo-daro.

Type R 37-XXXII (Mackay Type W) is a shallow dish with a beaded rim and a disc-base. Variant XXXII*a* has an out-turned rim and an unemphatic carination round the neck. It is unique in being decorated on the interior with concentric circles in black. Variant XXXII*b* has an inconspicuously out-turned rim. Variant XXXII*c* has a hammer-head rim. Variant XXXII*d* has a slightly inturned rim and a ring-base.

This type with its variants is quite common in the habitation-areas at Harappā, but is rare at Mohenjo-daro.

Type R 37-XXXIII (Mackay Type V) is a deep bowl or cover with an internally beaded rim and a sagger-base. Below the rim is a slightly raised band, marking the junction between the upper and lower parts of the vessel, which seem to have been made separately. Variant XXXIII*a* is marked by a widely flared rim and a sagger-base. Variant XXXIII*b* is roughly made with an oblique-edged rim and external corrugations. Variant XXXIII*c* has a ridged neck and tapering profile with traces of paring and trimming. Variant XXXIII*d* is better made and has a slightly concave profile. Variant XXXIII*e* is a roughly made rimless bowl. Variant XXXIII*f* has a rim with an internal beak.

This type with its variants is common in the habitation-areas both at Mohenjo-daro and Harappā.

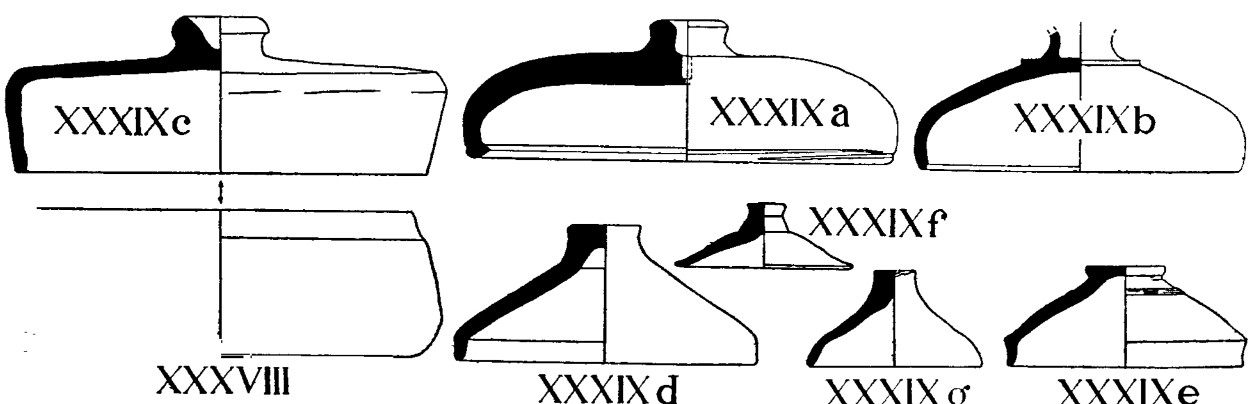


FIG. 20. *Pottery from Cemetery R 37.* 1/4

Type R 37-XXXIV (Mackay Type AC), one example, is a cup or lamp (no traces of burning) with a thin perforated ear-like handle. This type is the only instance of a handled vessel from Harappā. Mackay (*Chanhu-daro Excavations*, p. 82) suggests that these vessels were ladles. They are common in the habitation-areas both at Mohenjo-daro and Harappā.

Type R 37-XXXV, one example, is a featureless miniature bowl with straight sides, a flat horizontal rim and a wide thick flat base. A new type.

Type R 37-XXXVI is a casket with straight sides and a broad flat base. Variant XXXVI*a* has grooved sides tapering towards the mouth. This is a new type, though an analogue occurs in the lower levels at Mohenjo-daro (Mackay, II, pl. LXIV, 1).

[1] A clay figure of a woman kneading dough in a pan has been found at Harappā. Vats, II, pl. LXXVI, fig. 23.

Type R 37-XXXVII has an externally flanged rim to receive a lid and an emphatic base. Vessels of this type are often found intact with the lid as in variant XXXVII*a*, a single example, with an internally flanged rim, which was found covered with lid Type XXXIX*h*. This variant bears traces of a white slip. Variant XXXVII*b* may be classified as a developed variant of this type; it was closed, as shown, by a rough dish or lid of Type XXXVIII*e*. A new type.

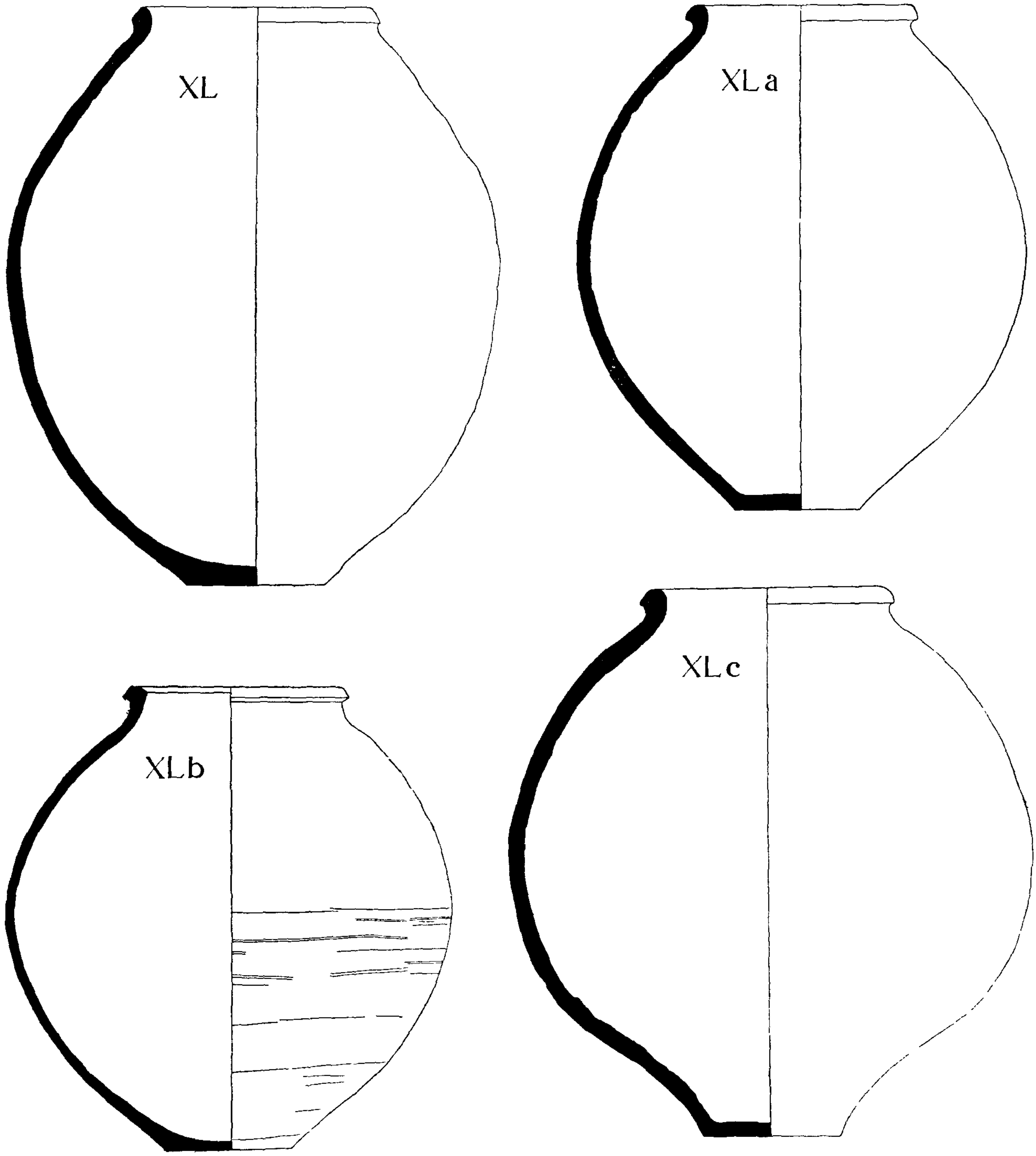


FIG. 21. *Pottery from Cemetery R 37.* $\frac{1}{5}$

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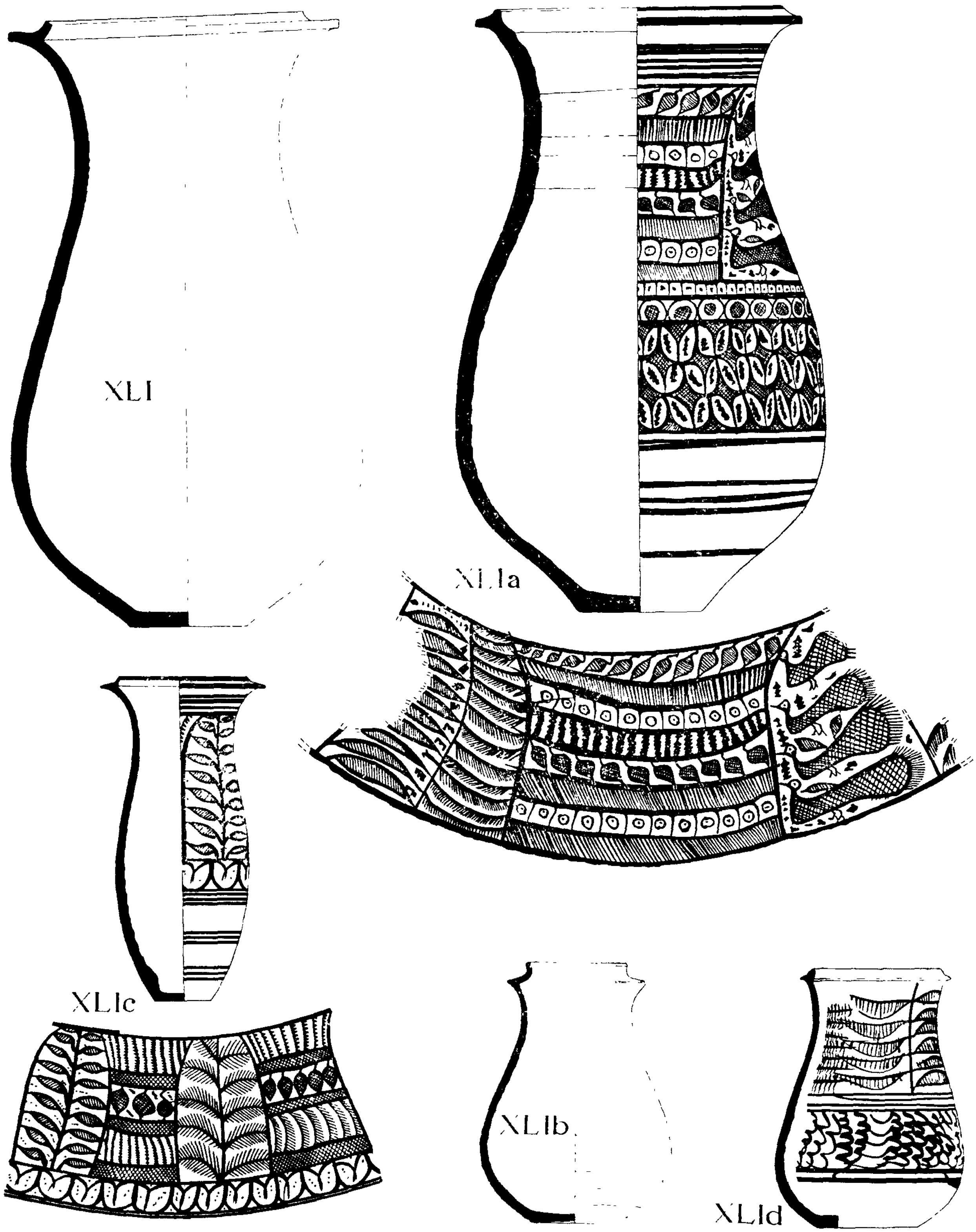


FIG. 22. *Pottery from Cemetery R 37.* $\frac{1}{5}$

Type R 37-XXXVIII has a recessed flange at the neck to receive a lid of Type XXXIX*c*. A new type.

Type R 37-XXXIX (Mackay Type X) is a lid with an externally hollow knob-handle. The specimen illustrated is painted with horizontal black bands (fig. 23). It was found in position on the painted storage-jar, Type XLII. Variants XXXIX*a*, *b* and *c* have also externally hollow knobs. Variant XXXIX*c* was found fitted on to Type XXXVIII. Variants XXXIX*d–e* have internally hollow knobs. Variants XXXIX*f–h* have solid knobs, the last variant covering a vessel of Type XXXVII*a*.

This type with its variants is common in the habitation-areas both at Mohenjo-daro and Harappā.

Type R 37-XL (Mackay Type AS) is an oval storage-jar with a thick clubbed rim. The thin white slip, which is characteristic of these pots, has in most cases been partially removed by a comb-like tool to allow the red body-colour of the pot to show through. Variant XL*a* has a beaded rim. Variant XL*b* has a bluntly beaked rim and traces of paring and trimming on the lower exterior. Variant XL*c* has a concave profile above the base.

This type and its variants are common on the habitation-sites of Harappā and Mohenjo-daro.

Type R 37-XLI (Mackay Type AS) is a tall storage jar with a prominent flange for a lid and a comparatively narrow base, possibly implying the normal use of a pottery stand. Variant XLI*a* is painted in black on a pale red slip with intricate geometric patterns of intersecting circles; roundels, cross-hatched or with a dot, *pipal*-leaf; palm-frond; and peacock (pl. XLVII A).[1] Variant XLI*b* is squat with a pronouncedly flanged rim and slightly concave base, and bears traces of paring on the lower exterior. Variant XLI*c* is a unique slender vase, painted in black on a pale red slip with bipinnate leaves, date-palm, *pipal*-leaf and matted patterns (pl. XLVII B). Variant XLI*d* is a squat vessel, painted in black with bipinnate leaves and bands of wavy lines (pl. XLVI, 3).

This type is common on the habitation-sites at Harappā and Mohenjo-daro.

Type R 37-XLII is a large bulbous jar with a flange round the neck. The largest example is painted in black on a dull red slip with *pipal*-leaves, conventionalized palm-frond and other plant-forms, but most of the painting has disappeared. It was found covered with the painted lid of Type XXXIX. Variant XLII*a* is less bulbous than the main type.

This type does not occur at Mohenjo-daro but is present in Area G at Harappā (Vats, II, pl. LXX, 16).

Type R 37-XLIII (Mackay Type AS) is a storage-jar with flanged rim, slender foot and beaded base. It is decorated with a series of black bands on the outside and two on the inside. This type occurs in the habitation-areas both at Harappā and Mohenjo-daro.

Type R 37-XLIV (Mackay Type AF), one example, is a tall cylindrical perforated vessel with an everted rim and a large circular hole in the centre of the base. It is characterized by two prominent grooves round the neck. Sir Aurel Stein found a complete specimen of this type at Firoz Khān-damb in Awārān, Makrān,[2] filled with charcoal and ashes, which presumably indicates that these vessels were used as heaters or braziers.[3] The holes round the body have a ragged or blurred edging, made by pushing a stick through the sides while the clay was still wet. Only a single example was found in R 37, though this type in various sizes is common in the habitation-areas both at Harappā and Mohenjo-daro.

Type R 37-XLV (Mackay Type AE) is a jar-stand with a concave profile. Variants XLV*a* and *b* differ from the principal type mainly in the shape of their rims. Variant XLV*c* is smaller in size and is characterized by its angular profile. Variant XLV*d* is unique in being decorated by several plain black bands outside and two bands inside.

This type with its variants is common in the habitation-areas both at Mohenjo-daro and Harappā.

(*iii*) *Pottery from layers immediately sealing Cemetery R 37*

The layers immediately overlying Cemetery R 37, as excavated in 1946, yielded a fair number of sherds, mostly plain but some painted with simple black horizontal bands—

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[1] Outside the Indus valley, the peacock does not occur on prehistoric pottery, doubtless because it is a native of India and was at that time unknown elsewhere. The peacocks on the pot-burials of Cemetery H, Stratum I, have religious associations.

[2] Aurel Stein, *Mem. Arch. Surv. Ind.*, No. 43 (1931), pp. 64, 130.

[3] These objects have recently been compared plausibly to the ritual-vessels that are used by devotees in Madras at the present day for burning camphor. Mackay, *Chanhudaro Excavations*, p. 83, and A. Aiyappan, 'Pottery Braziers of Mohenjo-daro', *Man*, 1939, No. 65.

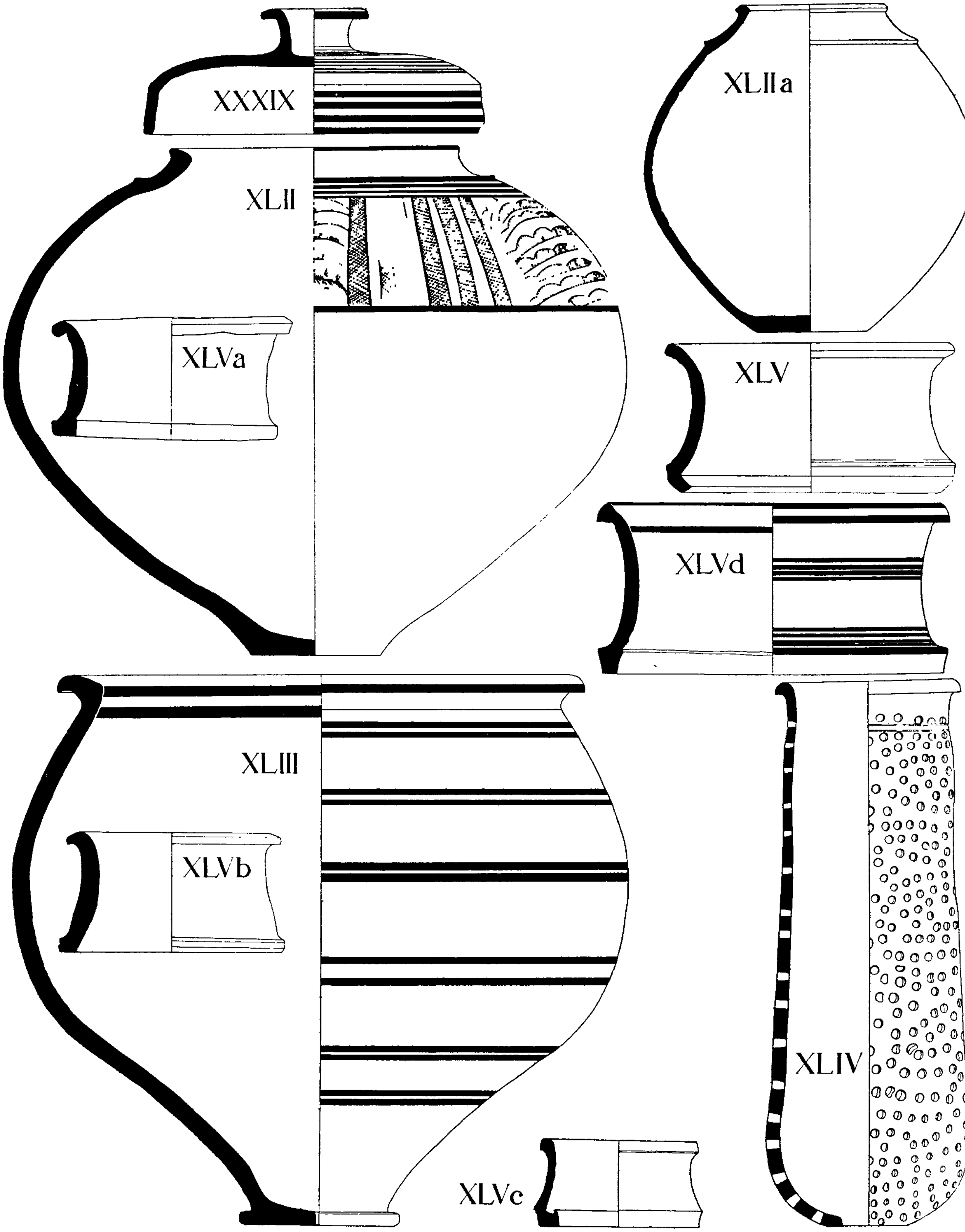


FIG. 23. *Pottery from Cemetery R 37.* $\frac{1}{5}$

all belonging to the true Harappā culture. Together with types common to the habitation-areas and Cemetery R 37 (R 37 Types I, IV, VI, IX*c* and XL), these also include shapes which are absent from R 37 but are characteristic of the main body of the mounds; such as Mackay Types B, C and S, miniature offering-stand (Type A—Mackay, II, pl. LV, 2) and basin (Type W, Mackay, II, pl. LVI, 50).

(*iv*) *Pottery from the débris-layer* (*later than Cemetery R 37 and earlier than Cemetery H*)

The extensive group of pottery from the débris-layer (pl. XXXIX, layer 5) represents almost all types found in the main body of the mounds, together with a few sherds typical of Cemetery H, Strata I and II.

The pottery is all wheel-turned, coarse in fabric (the clay being not well-levigated), well-fired [1] and drab or pale red in colour. The paintings are in black on a dull red slip. The decorative designs show a preference for geometric and linear patterns exemplified by interlacing circles, squares with concave sides, grid and fish-scale patterns; though simple plant-motifs, sometimes placed in metopes or panels, alternating with other designs, are occasionally found.

The few grey sherds recovered from the débris-layers are accidental, due to firing in a smoky kiln. No grey-ware culture has been noticed in any of the occupation-periods at Harappā or Mohenjo-daro. The goblets with pointed bases (Mackay Type B) preponderate largely over all other vessels.[2] The other notable types, in order of frequency, are medium-sized cylindrical vases [3] (Mackay Types C and H), round or oval jars with a projecting rib or beading at the shoulder and neck (Mackay Type F), and dishes with incurving or splayed rim (Mackay Type W).

Eleven samples from these layers are selected for illustration (fig. 24):—

1. Goblet with pointed base and scored exterior. This type, characteristic of the Harappā culture, was most prolific here.
2. A bowl with horizontal bands painted on the exterior, the black paint having 'run' at two places. Bowls like these were used as covers of the pot-burials of Cemetery H, Stratum I.
3. Base of a grey-ware cup-on-stand with a corrugated stem. Restored from Vats, II, pl. LXXII, 11.
4. Squat cup-on-stand, painted on the interior with loop, conventionalized leaf and floral patterns. Cup-on-stands of identical shape and decoration are characteristic of Cemetery H, Stratum II (Vats, II, pl. LVII, (*d*) 2).
5. A globular vessel with an undercut rim, grooved shoulder and restricted base. This type occurs in the habitation-areas at Harappā and Mohenjo-daro.
6. A small carinated beaker with flared mouth, painted with horizontal bands on the exterior. Analogues of this type occur occasionally in the habitation-areas at Harappā and Mohenjo-daro.
7. A small grey-ware vessel with rounded base and flaring mouth. Analogues of this type occur occasionally both at Harappā and Mohenjo-daro.
8. A narrow-mouthed oil-flask with wide girth and beaded base. This type is common in the habitation-areas both at Harappā and Mohenjo-daro.
9. A sherd painted with fish-scale pattern. This design is of common occurrence on the habitation-sites both at Harappā and Mohenjo-daro.
10. Fragment of a ribbed pot.
11. Rim-fragment of a bowl, painted on the exterior with a motif resembling a tortoise.

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[1] Very few instances of imperfect firing were noticed.

[2] The fact that these are turned up in thousands suggests that it may have been a practice with the Harappans, as it is still with the Hindus, to throw away the cup from which they had once drunk. Unless some such practice as this obtained at Mohenjo-daro and Harappā, it is difficult to account for the vast numbers of these vessels.

[3] A very common type on the mounds, evidently a staple product of the potter.

(v) *Pottery from Cemetery H, Stratum I*

Cemetery H consists of two strata, the upper (Stratum I) characterized by fractional pot-burials and the lower (Stratum II) by extended inhumations (see p. 84). Only a small portion of Stratum I, comprising three pot-burials, was exposed in 1946. Though the two strata are distinguished by a marked difference of burial-customs and an apparent divergence of pottery-types, a community of technique and pattern enable us to regard them as successive

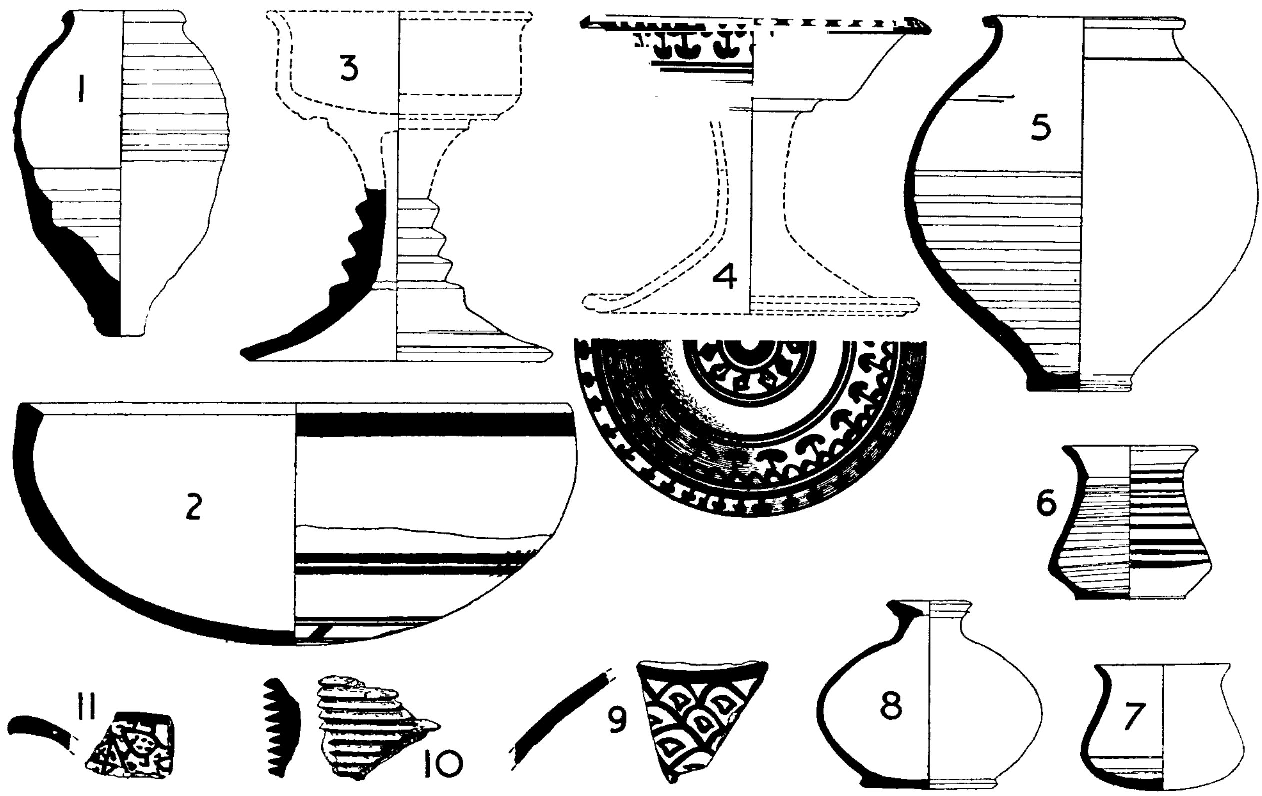


FIG. 24. *Pottery from the débris-layers intervening between Cemeteries R 37 and H.* ¼

phases of the same culture. The difference in the ceramic shapes of the two strata of the cemetery is functional rather than cultural, in that the large pots of Stratum I were meant to contain the actual burials, whereas the pottery of Stratum II served only as grave-furniture. The ware in both is burnt deep red and has a notably bright-red slip. The painted designs in jet black are often slightly blurred at the edges, as though they had 'run' on a wet ground. The majority of the characteristic patterns, such as star, fish, peacock, ox and goat, are common to both the strata. Stratum I shows larger groups of these with obviously mythological significance, while on the smaller vessels of Stratum II the designs seem for the most part to be purely decorative; but this difference may reasonably be ascribed to difference of size and function.

The pottery as a whole from Cemetery H is essentially alien in type, technique and decoration to that of the true Harappā culture. Its distribution is at present unknown, but it has been identified also at Lurewāta and Ratha Thēri in Bahāwalpur State. Its fabric has a finer texture and a darker red tone both in the core and in the slip. Its decorative motifs do not include the intersecting-circle, scale and other patterns,

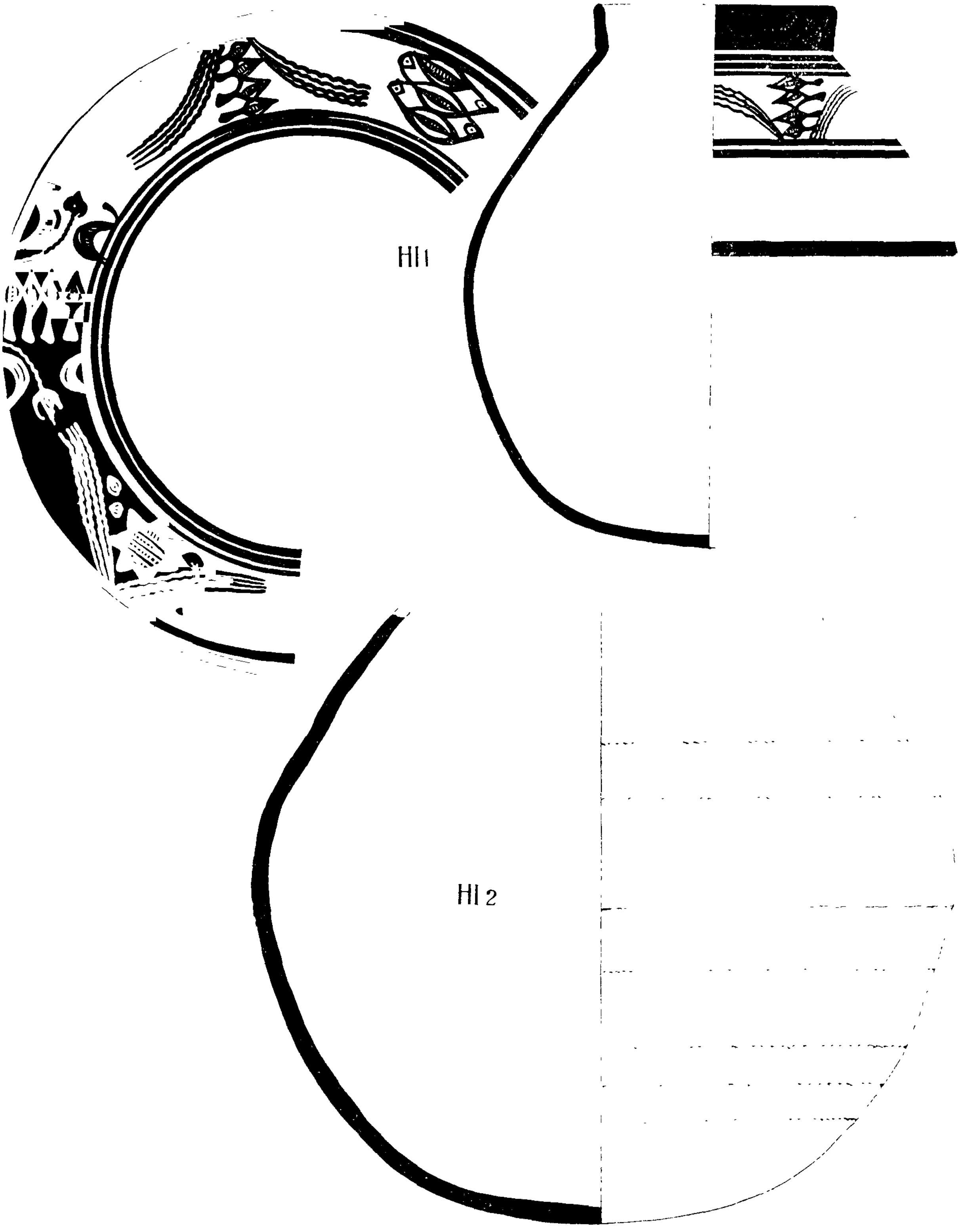


FIG. 25. *Pottery from Cemetery H, Stratum I.* $\frac{1}{5}$

characteristic of the Harappā culture, and the blurred outline is equally foreign to the latter. These facts, combined with structural evidence noted above (p. 74) and the thick deposit intervening between Cemeteries R 37 and H, firmly indicate a time-interval between the two cultures.

The commonest types of Cemetery H, Stratum I, are large ovoid jars with or without a flange round the rim to receive a lid; and pots with 'finger-tip' and 'finger-groove' patterns.

The following pot-burials were exposed in 1946:—

Pot-Burial No. 11 (fig. 25, 1). An ellipsoid jar with a short straight rim. It is painted successively with four fish between conventional streams of water, four fish between groups of vegetation, a star or sun between streams of water, and a group of two (or four) fish. (For the bones contained by the jar, see above, p. 89.)

Pot-Burial No. 12. A plain round jar with horizontal 'finger-groove' pattern. Only the lower half of the pot was intact. The 'finger-tip' and the 'finger-groove' patterns are a common feature of these plain pot-burials. (For the bones contained by the jar, see above, p. 90.)

Pot-Burial No. 13 (fig. 25, 2). A roughly-potted ellipsoid jar, now rimless, with a series of cord-marks round the body. The cords may have been functional to prevent the sagging of the large pot during the drying preliminary to baking. (For the bones contained by the jar, see above, p. 90.)

(*c*) Inscribed Pottery

Stamped and inscribed pottery, rare at Mohenjo-daro, is fairly common at Harappā. The stamped inscriptions, peculiar to the common scored goblets (Mackay Type B; above, fig. 10, 46) were presumably potters' marks.[1] The usual practice, however, was to incise or scratch the inscriptions after (rarely before) the firing of the vessel. Most of the graffiti consist of vertical or oblique strokes on the inner side of the rim, but pictographic signs similar to those of the seals also occur.

A stamped goblet (pl. L A and fig. 10, 46), from a late layer, is the only example of a stamped vessel from the present excavation. Nine similar goblets with identical stamps were, however, recovered from the earlier excavations at Harappā (Vats, II, pl. CII, 23 and 24, and pl. CIII, 46). Of the four signs in the present impression, three are distinct and correspond to the sign-list (Vats, II, pl. CV–CXVI) Nos. 133 and 168; the fourth sign is blurred but may be restored from Vats, II, pl. CIII, 46.

The following inscribed sherds were found in HP XXX (pl. XLVIII):—

1. Rim-fragment with pictographs engraved before firing, representing conventional fish(?). From the make-up of the platform.
2. Fragment of the dish of an offering-stand with pictographs engraved before firing, some of them indistinct. Of the identifiable signs, one is similar to No. 238*a* of the sign-list. From the make-up of the 'rampart'.
3. Inscribed sherd engraved before firing, from the make-up of the 'rampart'.
4. Inscribed rim-fragment engraved before firing with four pictographs, two of which correspond to the sign-list Nos. 370 and 437; the other two do not appear in the sign-list. From the make-up of the platform.
5. Rim-fragment engraved before firing with three oblique strokes, corresponding to sign-list No. 6. From the make-up of the 'rampart'.
6. Rim-fragment with traces of inscription engraved after firing. From the make-up of the 'rampart'.

The following inscribed sherds were recovered from the débris-layers of the cemetery-area (pl. XLIX):—

1. Base-fragment engraved before firing with a sign, incomplete but comparable to No. 195 of the sign-list.
2. Rim-fragment engraved before firing with two vertical strokes, on the rim, No. 2 of the sign-list.

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[1] At Mohenjo-daro too, the five fragments of jars bearing stamped marks belong only to this type (Marshall, I, 292, and III, pl. LXXVIII, 1, 3).



Graffiti on potsherds

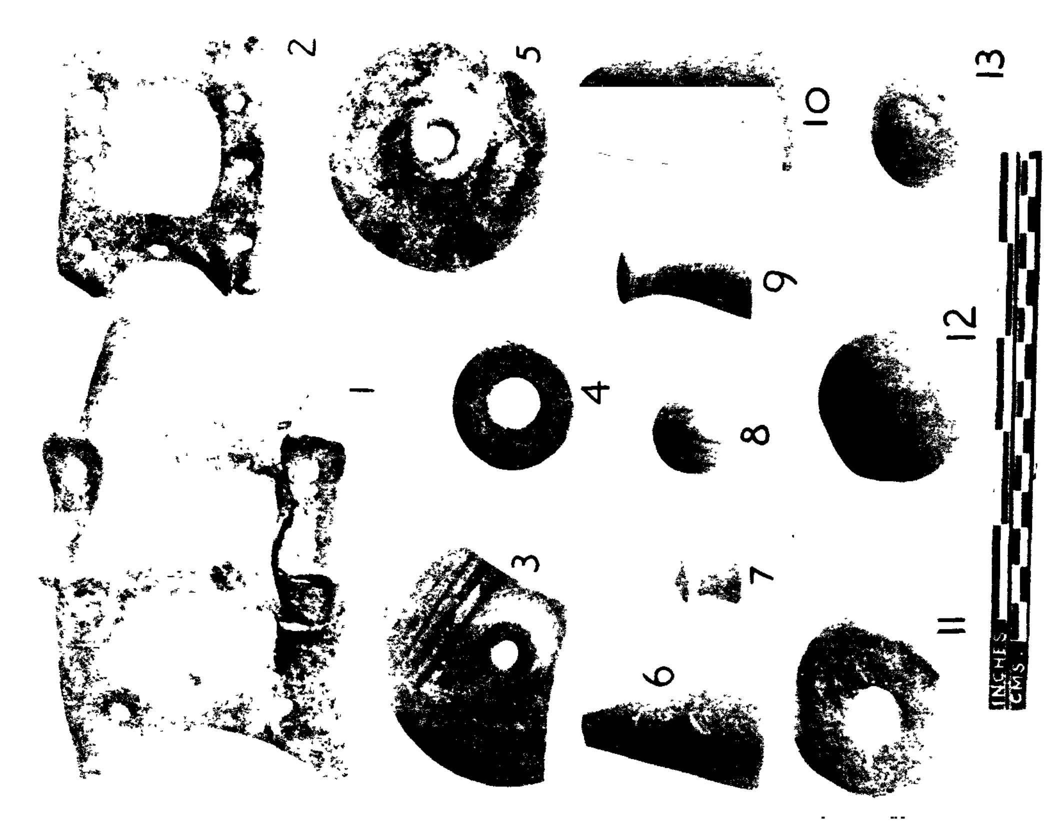
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Graffiti on potsherds

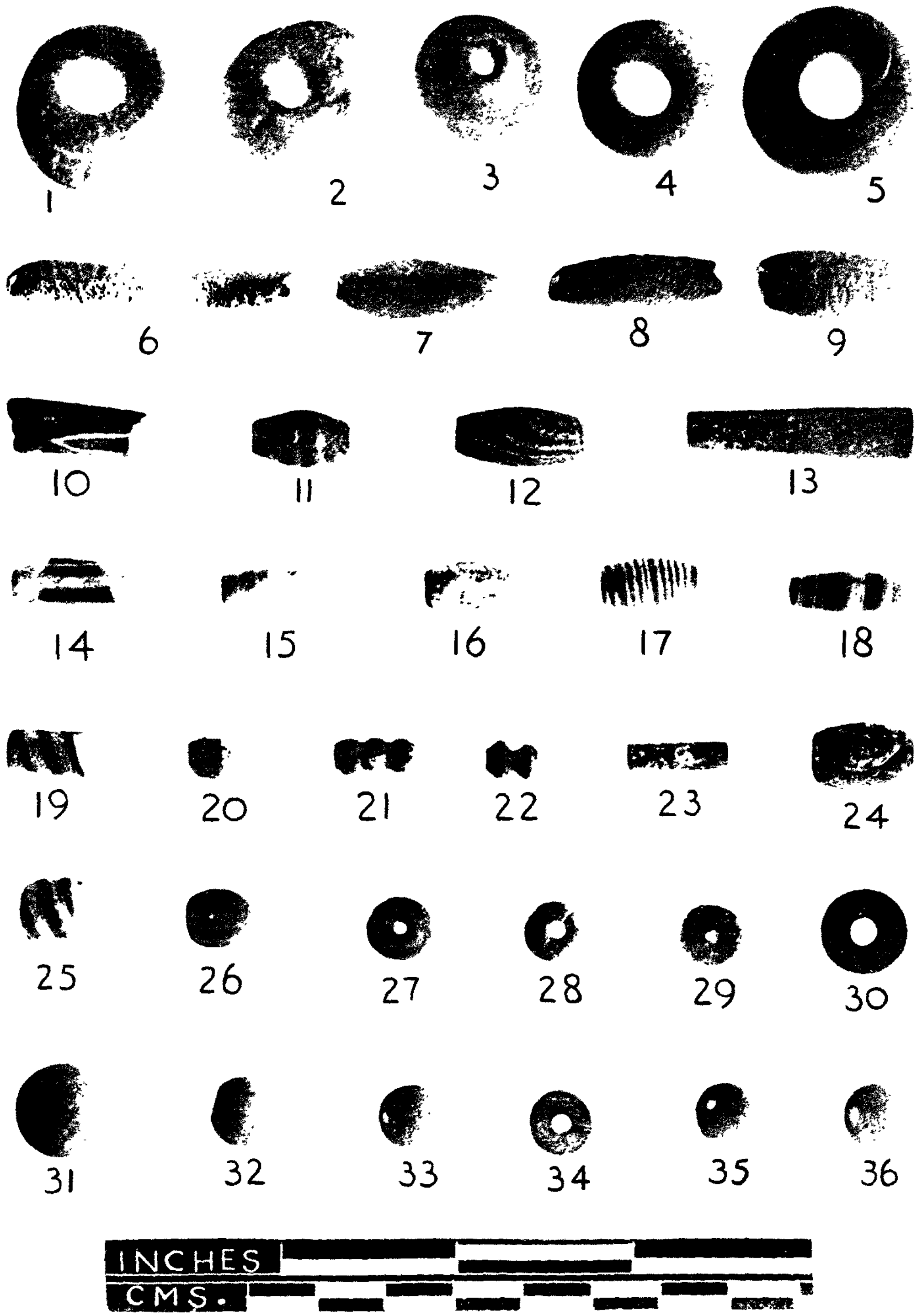


A. *Stamped 'Indus Valley goblet'*



B. *Miscellaneous terracotta objects*

To face page 121



Beads

3. Rim-fragment engraved before firing with three vertical strokes on the rim, No. 6 of the sign-list, and with rough scratchings representing conventional fish(?) on the body.

4. Sherd engraved before firing with two complete pictographs. Of the signs, one is similar to No. 238*c* of the sign-list but the other is not elsewhere recorded.

5. Rim-fragment engraved before firing with four oblique strokes on the rim, No. 9 of the sign-list.

6. Rim-fragment engraved on the rim before firing with signs similar to Nos. 1, 6, 168 of the sign-list.

7. Rim-fragment with two pictographs engraved after firing through the red slip. One of the signs is similar to No. 331 of the sign-list and the other appears to be a variant of No. 73 in having a horizontal central stroke instead of a vertical one.

7. OTHER FINDS[1]

(*a*) BEADS

The beads found in the previous excavations at Harappā were dealt with by H. Beck, who also discussed their foreign analogues.[2] The present excavation yielded two hundred and ten beads, eighty-three being from HP XXX, twenty-eight from the other sites excavated along the line of the defences, and the remaining ninety-nine from the cemetery-area. All the types and materials represented by them are included in the previous series. Most of the beads from HP XXX were from the accumulations against the outer face of the 'rampart' and were doubtless deposited there by the washings from the mound. A majority of the beads from the cemetery-excavation was derived from the débris deposited subsequently to Cemetery R 37 but prior to Cemetery H.

Steatite, which along with faïence was the common bead-material in the Harappā culture, accounted for one hundred and eighteen beads. They were mostly thin circular discs (fig. 26, 4-5; cf. Vats, pl. CXXXIII, 1), the diameter ranging from one-fourth to three-fourths of an inch. Nineteen such beads were found in HP XXX, distributed as follows:

From the make-up of the 'rampart'	4
From a layer contemporary with Period I on the platform ..	1
From a layer contemporary with Period V	4
From superficial débris	10

In the cemetery-area one such bead was found in each of the grave-pits for burials Nos. 1 and 2; further, a pre-grave layer yielded a group of fifteen beads, a post-grave but pre-débris layer eight stray beads, and the débris-layer forty-six.

Nine beads of a thicker variety of the same type (fig. 26, 6; cf. Vats, pl. CXXXIII, 1) were recovered; six were from HP XXX (four from layers of the 'rampart', and one each from Period IV and superficial débris), and one from the débris-layer of the cemetery-area.

Of the remaining steatite beads, one standard barrel circular bead was found in a superficial deposit of HP XXX and one in a post-grave but pre-débris deposit of the Cemetery R 37 area. Equivalent layers of the same sites respectively yielded one long cylindrical oblong and one long cylindrical circular bead. The débris-layer of the cemetery-area further yielded a spheroid bead.

The forty faïence beads show a greater variety of shapes than do those of any other material. The colour is usually light green, but there are some beads of white or dull-white colour, in two cases with dark brown spiral lines on them (fig. 26, 13 and 14, and pl. LI, 19 and 25; cf. Vats, pl. CXXXIII, 8).

Two spherical faïence beads were found in the pre-rampart deposits (layer 26) of HP XXX; except pottery, these constitute the only finds from these early layers. One more spherical bead was found in the make-up of the 'rampart', and four in post-rampart layers of HP XXX. One spheroid bead was found in a layer contemporary with Period VI on the platform of HP XXX. The débris-layer of the cemetery-area yielded one spherical and two spheroid beads. Three spherical and two spheroid beads also came from other rampart sites.

Three standard barrel circular beads of faïence were found in the superficial layers of HP XXX. One of them was decorated with incised grooves at each end and oblique lines in between (fig. 26, 8 and pl. LI, 1). Of the three long barrel circular beads, one was from a layer contemporary with Period III of HP XXX and the other two from the débris-layer of the cemetery-area.

[1] These sections are mainly the work of Mr. A. Ghosh and Mr. Krishna Deva.

[2] Vats, I, 392ff.

Cylindrical circular beads of faïence were represented by ten specimens, one of the standard type (from a superficial layer of HP XXX) and nine of the long type, three each being from the make-up of the 'rampart' and the post-rampart deposits of HP XXX and three more from the débris-layer of the cemetery-area. One unfinished cylindrical bead of uncertain cross-section was also found in the superficial levels of HP XXX.

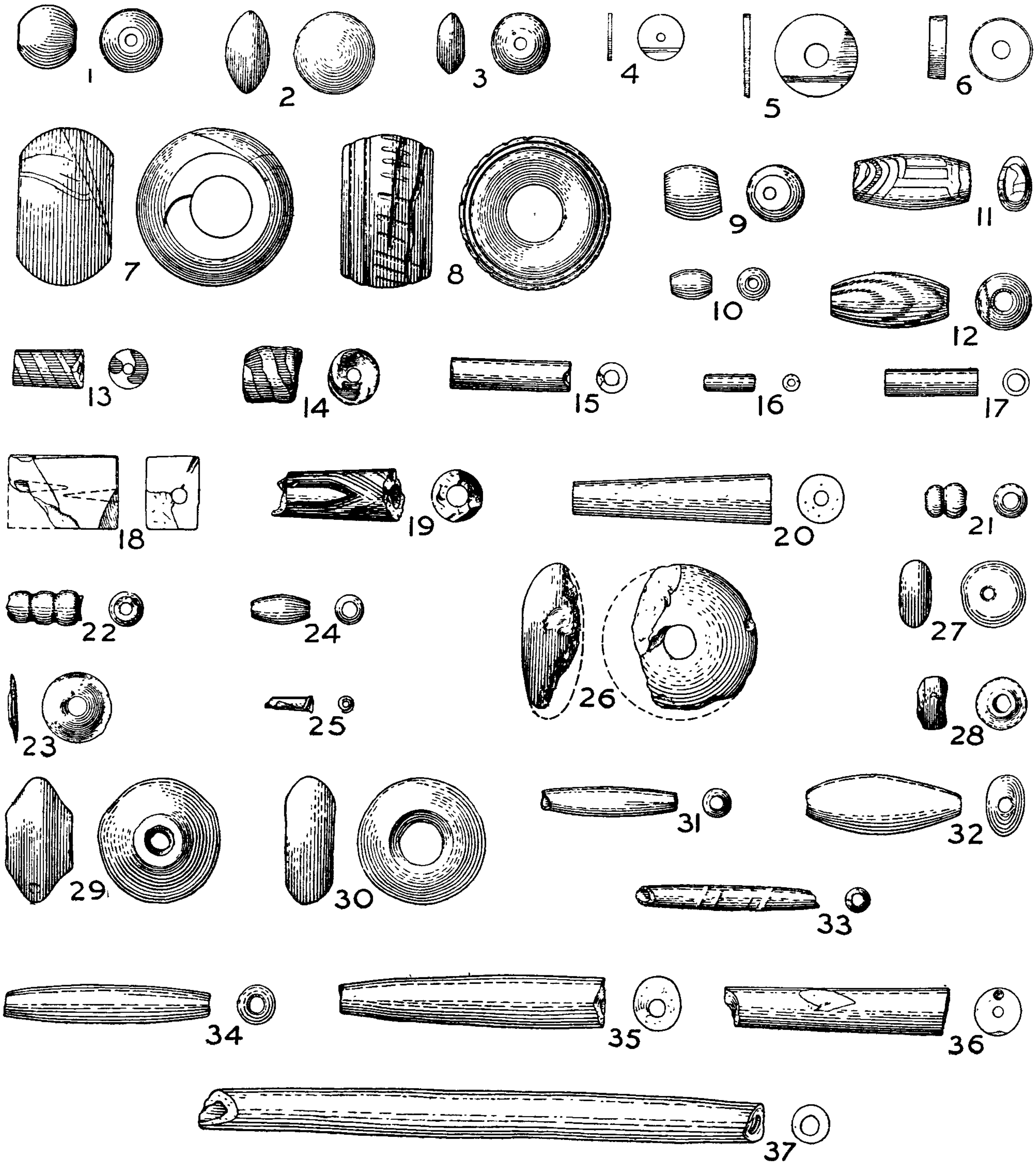


FIG. 26. *Beads.* $\frac{1}{1}$

Four segmented circular beads (fig. 26, 21 and 22 and pl. LI, 21 and 22; also Vats, pl. CXXXIII, 6) were found, two in HP XXX (Period V and post-rampart respectively) and one each in the débris-layer and a post-Cemetery H layer of the cemetery-area. The other shapes represented in faïence, viz. long cone, double-convex and truncated bicone, all of circular cross-section, consist of one specimen each and are all from the superficial layers of HP XXX.

Of the seven beads of banded agate, six are of the long barrel circular type, including one from the make-up of the 'rampart', three from the superficial layers of HP XXX, and one from the débris-layer of the cemetery-area. One long cylindrical circular bead was found in a pre-grave deposit of the Cemetery R 37 area. A superficial deposit of HP XXX yielded a long barrel oblate bead of etched carnelian (fig. 26, 11 and pl. LI, 14).

Three beads of gold leaf were found in the débris-layer of the cemetery-area (fig. 26, 23–25 and pl. LII A, 1–3; cf. Vats, pl. CXXXIV, 7). They are all of circular cross-section and are double-convex, long barrel and long cylindrical respectively in shape.

Shell beads are represented by three specimens. One was from the make-up of the 'rampart' in HP XXX and is truncated barrel circular in shape (fig. 26, 7; pl. LI, 5). The other two are from the post-débris-layers of the cemetery-area and are of the long barrel circular and long cylindrical circular types.

Most of the terracotta beads are very long (cf. fig. 26, 35–37); none is complete, but the longest extant piece is 3½ inches in length. Being hand-made, they are always roughly finished, nor do they bear any slip. Of these, HP XXX yielded two cylindrical circular specimens (both from the make-up of the 'rampart'), and thirteen of barrel form, distributed as follows:—

From the make-up of the 'rampart' ..	3
Period III on the platform	1
Period IV	1
Period V	1
From superficial layers	7

In the débris-layer of the cemetery-area were found five barrel beads and in other sites two, in addition to one barrel oblate and one cylindrical circular bead.

Long barrel terracotta beads, but not of the very long variety (cf. fig. 26, 31–34), were found in lesser numbers. Two barrel circular beads were found in superficial deposits and one in the make-up of the 'rampart' in HP XXX; in the latter deposit was also found a barrel oblate bead (fig. 26, 32).

Of the three oblate circular terracotta beads, one was found in the make-up of the 'rampart' in HP XXX (fig. 26, 26), and the remaining two in the débris-layer of the cemetery-area. One bead each of the truncated bicone circular type (fig. 26, 30) was recovered from Periods III and V on the platform of HP XXX. A spherical terracotta bead was found in a layer of Period V in the same cutting.

List of selected beads (fig. 26)

1. Faïence: spheroid. Period VI. (HP XXX-65.) See also pl. LI, 32.
2. Faïence: unbored double-convex circular. Post-rampart. (HP XXX, 249.)
3. Faïence: truncated bicone circular. Post-rampart. (HP XXX, 131.) See also pl. LI, 27.
4. Steatite: disc cylinder circular. Post-rampart. (HP XXX, 64.)
5. Steatite: disc cylinder circular. Contemporary with 'rampart'. (HP XXX, 450.)
6. Steatite: disc cylinder circular. Unstratified. (HP XXX, 198.)
7. Shell: truncated standard barrel circular. Contemporary with 'rampart'. (HP XXX, 487.)
8. Faïence: standard barrel circular with oblique incisions. Post-rampart. (HP XXX, 347.) See also pl. LI, 1.
9. Faïence: standard barrel circular. Post-rampart. (HP XXX, 94.) See also pl. LI, 5.
10. Faïence: long barrel circular. Period III. (HP XXX, 133.)
11. Carnelian, etched: long barrel oblate. Post-rampart. (HP XXX, 71.) See also pl. LI, 14.
12. Agate, banded: long barrel circular. Post-rampart. (HP XXX, 342.) See also pl. LI, 12.
13. Faïence: long cylindrical circular. Contemporary with rampart. (HP XXX, 230.) See also pl. LI, 19.
14. Faïence: standard roughly cylindrical circular. Post-rampart. (HP XXX, 1.) See also pl. LI, 25.
15. Faïence: long cylindrical circular. Contemporary with 'rampart'. (HP XXX, 389.)
16. Faïence: long cylindrical circular. Unstratified. (HP XXXII W.E., 22.)
17. Shell: long cylindrical circular. Unstratified. (HP XXXII, 9.) See also pl. LI, 23.

18. Steatite: long cylindrical oblong. Post-rampart. (HP XXX, 339.)
19. Agate: long cone circular. Unstratified. (HP XXIX, 124.) See also pl. LI, 10.
20. Faïence: long cone circular. Post-rampart. (HP XXX, 297.) See also pl. LI, 13.
21. Faïence: segmented circular. Post-rampart. (HP XXX, 60.)
22. Faïence: segmented circular. Unstratified. (HP XXXII, 44.) See also pl. LI, 21.
23. Gold leaf: double convex circular. Unstratified. (HP XXXII W.E., 8.) See also pl. LII A, 1.
24. Gold leaf: long barrel circular. Unstratified. (HP XXXII W.E., 7.) See also pl. LII A, 3.
25. Gold leaf: long cylindrical circular. Unstratified. (HP XXXII, 53.) See also pl. LII A, 2.
26. Terracotta: oblate circular. Contemporary with 'rampart'. (HP XXX, 156.)
27. Terracotta: oblate circular. Unstratified. (HP XXXII, 15.)
28. Terracotta: roughly oblate circular. Unstratified. (HP XXXII, W.E., 17.)
29. Terracotta: truncated bicone circular. Period III. (HP XXX, 89.) See also pl. LI, 3.
30. Terracotta: truncated bicone circular. Period V. (HP XXX, 365.) See also pl. LI, 4.
31. Terracotta: long barrel circular. Post-rampart. (HP XXX, 332.)
32. Terracotta: long barrel oblate. Contemporary with 'rampart'. (HP XXX, 167.) See also pl. LI, 7.
33. Terracotta: long barrel circular. Post-rampart. (HP XXX, 335.)
34. Terracotta: long barrel circular. Unstratified. (HP XXVII, W.E., 13.)
35. Terracotta: long barrel circular. Post-rampart (HP XXX, 259.)
36. Terracotta: long cylindrical circular. Contemporary with 'rampart'. (HP XXX, 377.)
37. Terracotta: long cylindrical circular. Period III. (HP XXX, 417.)

(*b*) Bangles and Rings

Personal ornaments of faïence and steatite (pl. LIII A) consist of bracelets or bangles, together with two finger-rings. The bangles are either plain or ornamented with incised linear patterns and in one case (No. 16) with deep oblique lines. For analogues from previous excavations, see Vats, II, pl. CXXXVIII.

1–3. Fragments of bangles of green faïence, respectively oval, oblate and circular in section. From HP XXX, near the surface.

4–7 and 9. Fragments of steatite bangles. Nos. 4, 6, 7 and 9 are oblong and No. 5 plano-convex in section. Unstratified.

8 and 10. Fragments of bangles of green faïence, plano-convex and oblate respectively in section. Unstratified.

11. Fragment of a steatite ring, oblong in section. From HP XXX, near the surface.

12. Fragment of a polished green faïence bangle, circular in section. From HP XXX, Period V on the platform.

13. Fragment of a green faïence bangle, circular in section. From the débris-layer of the cemetery-area.

14. Fragment of a white faïence finger-ring. From the débris-layer of the cemetery-area.

15. Fragment of a polished green faïence bangle, oblate in section. From HP XXX, Period V on the platform.

16. Fragment of a greenish faïence bangle with deep oblique or semi-spiral grooves on the outer face; one end contains two concentric grooves marking the position of the joint of the bangle. Unstratified.

17-18. Fragments of two white faïence bangles, oblate and circular respectively in section. Unstratified.

19-20. Fragments of two white faïence bangles, oblate and circular respectively in section. From HP XXX, Period VI on the platform.

Terracotta bangles and a ring are illustrated on pl. LIII B.

1-2. Bangles, circular and oval respectively in section. From HP XXX, make-up of the 'rampart'.

3. Fragment of a bangle with cog-wheel edge. Unstratified.

4. Bangle, rectangular in section. From HP XXX, make-up of the 'rampart'.

5. Finger-ring. Unstratified.

6. Bangle, circular in section; the rough joint of the two ends is visible. Unstratified.

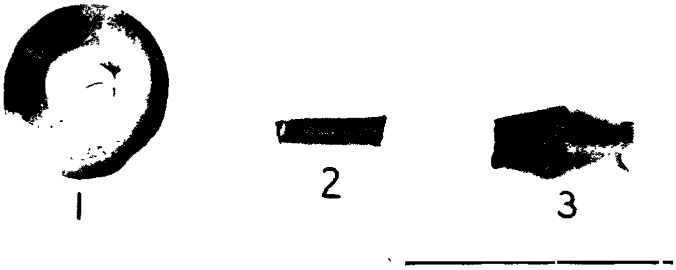
7. Fragment of a bangle with a corrugated outer face. Unstratified.

8. Fragment of a polished bangle, triangular in section. From HP XXX, Period V on the platform.

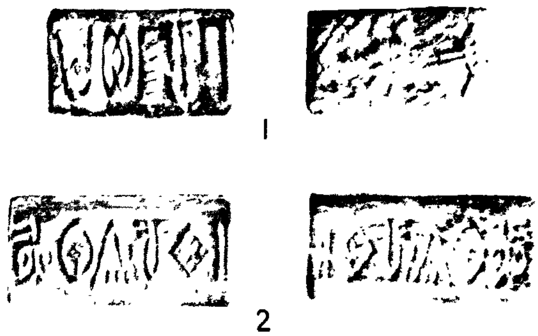
9. Fragment of a bangle made of two pieces pressed together, both circular in section. Unstratified.

10. Fragment of a polished bangle, oval in section. Unstratified.

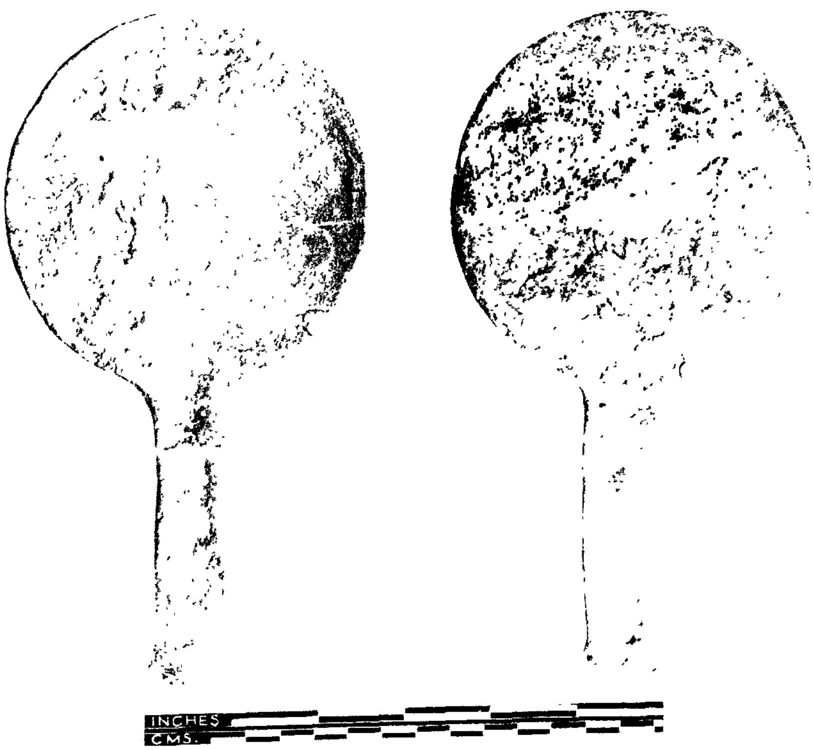
11. Fragment of a grey bangle, triangular in section. Unstratified.



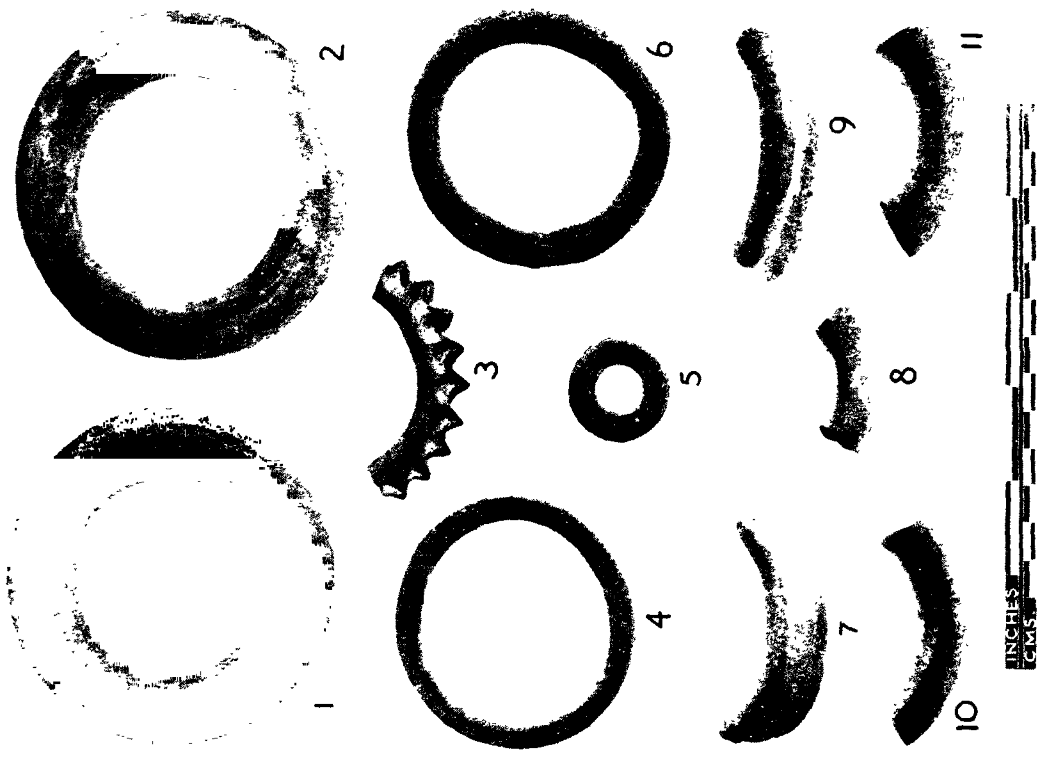
A. *Gold beads.* $\frac{2}{1}$



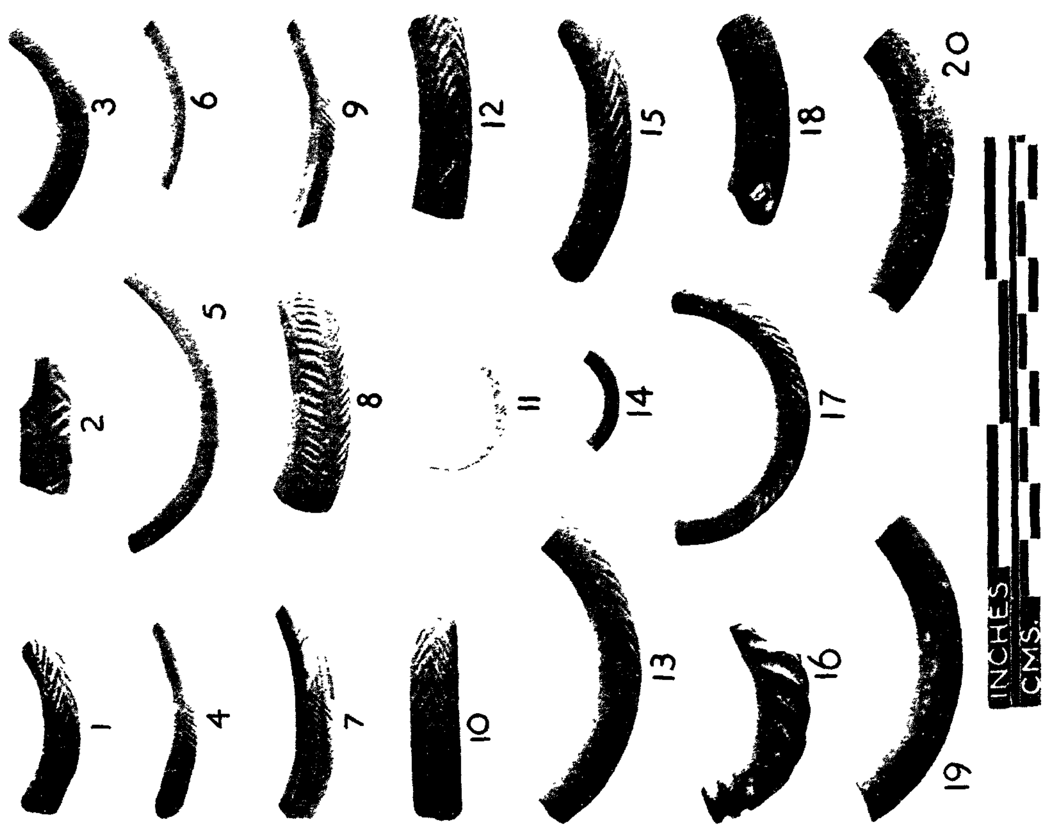
B. *1, terracotta seal-impression, front and back ; 2, steatite seal, with impression (left).*



To face plate LIV



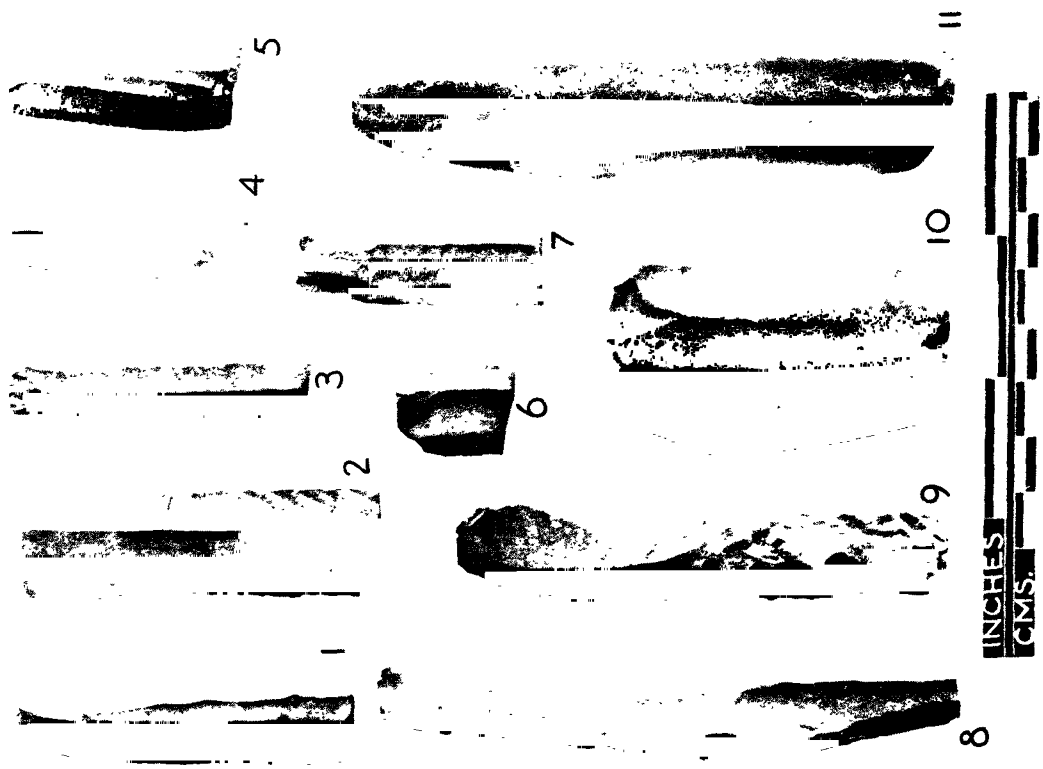
B. *Terracotta bangles and ring*



A. *Bangles of faïence and steatite*



A. *Shell objects*



B. *Chert blades and cores*



Saddle-quern, rubber, and other stone objects
(Scale of inches)

The shell objects include fragments of bangles, a ring, and roughly-sawn or unfinished objects and rejects (pl. LIV A).

1. Fragment of a bangle, plano-convex in section. Unstratified.
2. Fragment of a bangle, pentangular in section. From HP XXX, near the surface.
3. Fragment of a ring, rectangular in section. From the cemetery-area, near the surface.

4-5. Fragments of bangles with a bevelled edge and an irregular section respectively. From HP XXX, make-up of the 'rampart'.

6. Fragment of a bangle, triangular in section. From HP XXX, Period V on the platform.

7 and 9. Fragments of bangles with irregular sections. Respectively from HP XXX, make-up of the 'rampart', and the cemetery-area, débris-layer.

8. Fragment of an unfinished bangle. From HP XXX, near the surface.

(*c*) Other Shell objects (pl. LIV A)

10. Upper portion of a rejected shell. From HP XXX, make-up of the 'rampart'.
11. Fragment probably of the handle of a ladle. From HP XXX, Period IV on the platform.
12. Fragment of an uncertain object with grooves at two ends. From HP XXX, make-up of the platform.
13. Fragment of a bangle, roughly triangular in section. From HP XXX, near the surface.

(*d*) Chert

Blades and cores of chert occur abundantly at Mohenjo-daro and Harappā. The blades are of a fairly uniform type, being thin and long, normally trapezoidal in section, and usually without retouch. In a few cases (e.g. No. 9, below) the edge has been slightly toughened by vertical retouch at a few points, and in two or three cases a saw-edge seems intentional, but in most examples the jagged edges are the result of usage and other wear upon the unworked blade. The edges show no gloss. These blades appear commonly to have been used as knives. The cores have in many instances been polished for use, but their function is less obvious. In one instance (No. 7) the flattened under-surface and the broad end sharpened by the removal of a single transverse flake suggests that the implement was used as a chisel.

Characteristic examples found in 1946 are illustrated on pl. LIV B:—

1-2. Blades. From HP XXX, make-up of the 'rampart'.

3-4. Blades. From HP XXX, make-up of the platform.

5. Core. From the débris-layer of the cemetery-area.
6. Fragmentary flake, found in association with burial No. 1 in Cemetery R 37 (above, p. 86).
7. Core, with flattened under-side and sharpened end; probably a chisel. From HP XXX, Period I on the platform.
8. Blade. From HP XXX, Period V on the platform.
9. Blade, with slight lateral retouches. From a post-grave but pre-débris layer of the cemetery-area.
10. Core. From HP XXX, Period III on the platform.
11. Core. From HP XXX, make-up of the platform.

(*e*) Mirror

The only important copper [1] object found in 1946 was a circular handled mirror (pl. LII C), found in a

[1] The Chemist of the Archaeological Survey of India reports as follows:—

Chemical analysis of the borings from the mirror gave the following results:—

Copper	81·90
Lead	2·39
Tin	0·34
Silica	0·20
Sulphur	0·64
Zinc	Traces
Iron	Traces
Oxygen by difference ..	14·53
Total ..	100·00

The analysis shows that the mirror is made of copper. Tin is present only to the extent of 0·34% and is evidently an impurity in the copper ore. Nickel and arsenic could not be detected. The metal has been much oxidized, about 15% of the sample being accounted for by oxygen.

pot (Type XL*a*, above p. 87), associated with burial No. 2 of Cemetery R 37. An oval copper mirror was previously found at Harappā (Vats, II, pl. CXXIV, 29).

(*f*) SEALS

The present excavation yielded one seal and one seal-impression (pl. LII B):—

1. Oblong steatite seal with six pictograms corresponding to the sign-list Nos. 388, 69, 164, 238, 120 and 2. From an unstratified layer. A steatite seal bearing identical pictographs with a bull ('unicorn') was found in the previous excavations (Vats, II, pl. LXXVI, 17).

2. Oblong terracotta seal-impression showing five pictograms on the obverse and a crocodile and fish on the reverse. An identical seal was found in the previous excavations (Vats, II, pl. XCIV, 337). The five pictograms correspond to the sign-list Nos. 145, 238, 270, 89 and 412. From Cemetery R 37, débris-layer.

(*g*) STONE OBJECTS (OTHER THAN CHERT)

The objects illustrated on pl. LV are all of sandstone and are derived from HP XXX.

1. Saddle-quern. From the make-up of the 'rampart'. Cf. Marshall, III, pl. CXXX, 17.
2. Pestle. From a post-rampart layer.
3. Fragment of a pestle. From a post-rampart layer.
4. Ball. Unstratified. Cf. Vats, II, pl. CXVII.
5. Fragment of a conical pestle. Contemporary with Period V on the platform. Cf. Vats, I, 358.
6. Spheroid object, slightly flattened at the base and top, possible a weight (weight 5452 grains). Unstratified. Cf. Vats, II, pl. CXVIII, 30.

(*h*) TERRACOTTAS

(*i*) *Human figurines*

The present excavation yielded sixty-five terracotta human figurines, forty-eight from the cemetery-area, twelve from HP XXX, and the remaining five from other cuttings along the line of the defences. With the exception of a few specimens, e.g. pl. LVII, 16, which is a hitherto unpublished type, and Nos. 1, 8, 26 and 27 which are new variants of familiar types, all the figurines belong to the published types from Harappā and Mohenjo-daro. A majority consists of female figurines, invariably draped in a short loin-cloth and often with fan-shaped head-dress and side-appendages or panniers which generally bear a black stain both on the interior and on the exterior. The inference is that the panniers were utilized as lamps or for the burning of incense. The appliqué technique used for head-dress, jewellery, eyes, mouth and breasts on the vast majority of the Indus figurines has already been discussed in previous publications,[1] and will be referred to below only when there is a departure from the established practice.

Of the figurines from HP XXX, one (pl. LVIII, 21) is contemporary with the building of the defences; three (one of them illustrated on pl. LVII, 12) are from Period II on the platform; one, a much-worn specimen of the same type as No. 1, is from Period V; while the remaining seven are unstratified.

The figurines from the cemetery-area are derived exclusively from the débris deposited subsequently to Cemetery R 37 and prior to Cemetery H. Of forty-eight figurines from this source, twenty-one are illustrated; fourteen are female figurines wearing a fan-shaped head-dress with side-panniers (similar to pl. LVI, 1); two are identical with pl. LVII, 18; one each is analogous with Nos. 20 and 25; while the remainder are too fragmentary for identification.

The following figurines are illustrated (pls. LVI–LVIII):—

1. Bust of a female figurine wearing a fan-shaped head-dress with black-stained panniers to which cones are attached. It resembles a well-known type illustrated in Vats, II, pl. LXXVII, 37, but our example shows no rosettes on the head-dress nor any collar-ornament. From the cemetery-area, débris-layer.

2. Female figurine (lower portion missing) standing with wedge-shaped arms outstretched and wearing a large fan-shaped head-dress with panniers and cone-attachments (the latter are now missing), a fillet on the

[1] Marshall, I, 338–355; Mackay, I, 257–316; Vats, I, 292–309.

forehead, a tight collar-ornament with pendants, a necklace of three strips, and a loin-girdle of which only traces survive. The navel is indicated by a hole. This is a common type but for the fillet on the forehead, which is rarely represented on the Indus figurines (cf. Mackay, II, pl. LXXII, 4). From the cemetery-area, débris-layer.

3. Standing female figurine (lower portion missing) with bird-like face, somewhat similar to Vats, II, pl. LXXVII, 45. The figure wears a mutilated head-dress (probably of the usual fan-type with panniers), a tight collar-ornament of three strips with several pendants, a necklace of two strings with a disc-shaped pendant or clasp and a loin-girdle of which only traces survive. From the cemetery-area, débris-layer.

4. Female bust showing a crude facial type resembling Vats, II, pl. LXXVI, 30, a fan-shaped head-dress with pointed ends (similar to Mackay, II, pl. LXXV, 1), and a large disc-shaped object near each ear which may represent a ear-ornament. For a somewhat similar ear-ornament, cf. Marshall, III, pl. XCV, 28; Vats, II, pl. LXXVII, 51 and 53. From the cemetery-area, débris-layer.

5. Head of a human figurine wearing a fan-shaped head-dress adorned with a row of three rosettes (similar to Vats, II, pl. LXXVII, 36–40) and discoid ear-ornament, similar to that of the previous figure, but cruder and partly impinging upon the eyes. From the cemetery-area, débris-layer.

6. Bust of a female figurine, wearing a mutilated head-dress with side-panniers and showing a smiling face with a prominent aquiline nose and small chin, which is unusually well-modelled for an Indus-figurine. Unlike others, the mouth and chin of this figurine are represented by a single applied strip of clay. Eyes missing. From the cemetery-area, débris-layer.

7. Female figurine (arms and lower portion missing) with hair tied in a simple back-knot. It wears no jewellery save discoid ear-ornaments as on Nos. 4 and 5. The mouth of the figurine is indicated by a simple incision. From the cemetery-area, débris-layer.

8. Bust of a female figurine with bird-like head. It wears round the neck what looks like a scarf of two folds, projecting outward. From the cemetery-area, débris-layer.

9. Bust of a bearded male figurine, not unlike Mackay, II, pl. LXXII, 8, wearing a tight collar-ornament of two strings with several pendants and with hair brushed back. From a late layer along the line of the defences.

10. Female head, wearing a head-dress with voluted ends, a cone-ornament over the forehead, oblong ear-ornament slightly impinging on the eyes (as on No. 5), and a collar-ornament of two strings with pendants. It is of the same type as Vats, II, pl. LXXVII, 51–54. Unstratified.

11. Similar, but the cone-ornament mutilated, while a strand of hair hangs down to the left from the forehead, as in Marshall, III, pl. XCV, 13.

12. Head, bird-like but possibly human, with sockets for the eyes and mouth. From HP XXX, Period II.

13. Red-slipped female figurine (mutilated), with the right hand touching the loins and wearing a collar-ornament with pendants and a loin-cloth. From the cemetery-area, débris-layer.

14. Mutilated torso of a standing female figurine wearing a loin-cloth secured by a girdle of three strings which is adorned with three medallions. Navel represented by an incised pellet (cf. Mackay, II, pl. LXXV, 5). From a late layer.

15. Left half of a female torso, standing with the arm pendant and wearing a loin-cloth of which faint traces survive. Head and feet missing. From the cemetery-area, débris-layer.

16. A crude human bust with hands raised. The mouth is indicated by an inconspicuous incision. A new type. From the cemetery-area, débris-layer.

17. Rectangular foot-board with a pair of crude human feet, each showing only four toes. Similar to Vats, II, pl. LXXVI, 25. From the cemetery-area, débris-layer.

18. Human figurine squatting with arms round the knees. A common Harappan type, similar to Vats, pl. II, LXXVI, 3 and Marshall, III, pl. XCV, 19. No attempt to delineate the eyes or mouth. From the cemetery-area, débris-layer.

19. Similar, but with facial features portrayed. Forearms and forelegs broken off. From a late layer.

20. Crudely executed male torso. From the cemetery-area, débris-layer.

21. Bust of a female figurine wearing a head-dress with voluted ends (now mutilated) of the type shown on Nos. 10 and 11. This type occurs both at Mohenjo-daro (Marshall, I, pl. XII, 1) and Harappā (Vats, II, pl. LXXVII, 51–54). From HP XXX, earthen make-up of the 'rampart'.

22. Female head wearing a fan-shaped head-dress with panniers, below which are attached flat tapering strips of clay. This type is common both at Harappā and Mohenjo-daro. From the cemetery-area, débris-layer.

23. Crudely-executed female figurine (arms and feet mutilated) wearing a fan-shaped head-dress and a loin-cloth of which only faint traces survive. The mouth is represented by a single applied strip of clay and the navel

by a shallow hole. The eyes have not been portrayed. Being bereft of all jewellery, it is a new variant of a common female type with the fan-shaped head-dress. From the cemetery-area, débris-layer.

24. Bust of a female figurine wearing on the forehead what looks like a mutilated cone-ornament. The head-dress together with side-appendages is broken off. A similar cone-ornament occurs on Vats, II, pl. LXXVI, 23; pl. LXXVII, 31. From the cemetery-area, débris-layer.

25. Upper portion of a crude figure (probably male, as indicated by small breasts). The mouth is represented by a shallow scratched line; there is no indication of the eyes. From the cemetery-area, débris-layer.

26. Highly decorated female head. Besides the usual fan-shaped head-dress (now mutilated) with panniers, it has immediately above the head an ornament resembling a deep bowl with ribbed exterior, while a sunflower (only one surviving now) was originally affixed to the base of each pannier. The figurine also wears a tight collar-ornament with numerous pendants. This is a variant of the type illustrated in Vats, II, pl. LXXVII, 41–43. From the cemetery-area, débris-layer.

27. Human (probably female) head wearing a new type of head-dress consisting of a circular, slightly concave disc, somewhat resembling a snake's hood. From the cemetery-area, débris-layer.

28. Crude human bust, wearing a tight collar-ornament with four pendants. From the cemetery-area, débris-layer.

(ii) Animal figurines

The following are selected for illustration (pls. LIX-LX):—

1. Rhinoceros, with eyes represented by incised pellets, nostrils by holes, mouth by a gash, and ears (now mutilated) by strips of clay first applied and then incised. The heavy folds of the skin are indicated by two broad strips of clay, pricked with holes. Legs and tail mutilated. Similar to Marshall, III, pl. XCVII, 8. From the cemetery-area, débris-layer.

2. Roughly-modelled animal, possibly rhinoceros, mutilated. The skin is represented as on the previous figurine, with the addition of a longitudinal strip along the spine, giving the two heavy strips the appearance of a pack. Similar to Mackay, II, pl. LXXVII, 22. From the cemetery-area, débris-layer.

3. Model of a humped bull. The eyes are indicated by incised pellets of clay. Similar to Mackay, II, pl. LXXIX, 26. From the cemetery-area, débris-layer.

4. Model probably of a ram but with a pig-like muzzle. Eyes represented by incised pellets. Horns mutilated. From the cemetery-area, débris-layer.

5. Model of a ram. The eyes are indicated by discoid pellets, mouth by a gash, nostrils by holes, and the horns bear incised lines representing natural rings. From the cemetery-area, débris-layer.

6. Well-modelled ram. The eyes are represented by incised pellets, mouth by an incised line and the nostrils by holes. The ears and the horns with the incised rings are faithfully delineated. From the cemetery-area, débris-layer.

7. Crudely-modelled humped bull. From the cemetery-area, débris-layer.

8. Roughly-modelled buffalo. The eyes are indicated by incised pellets, mouth by a gash, and nostrils by holes. From the cemetery-area, débris-layer.

9. Crude model of an animal with a long neck which was bored before baking evidently to receive a detachable head. From the cemetery-area, débris-layer.

10. Model of a rhinoceros. Its wrinkled warty skin is represented by strips of clay with combings, eyes by discoid pellets and mouth by a gash. From HP XXX, Period V on the platform.

11. Rough model of a rhinoceros. The thick hide is aptly represented by applied strips of clay. Unstratified.

12. Model of a curious animal with a very definite beard. The eyes are represented by transversely incised pellets and the beard by incision. From the cemetery-area, débris-layer.

13. Rough model probably of an antelope. From the cemetery-area, débris-layer.

14. Crudely-modelled humped bull. From the cemetery-area, débris-layer.

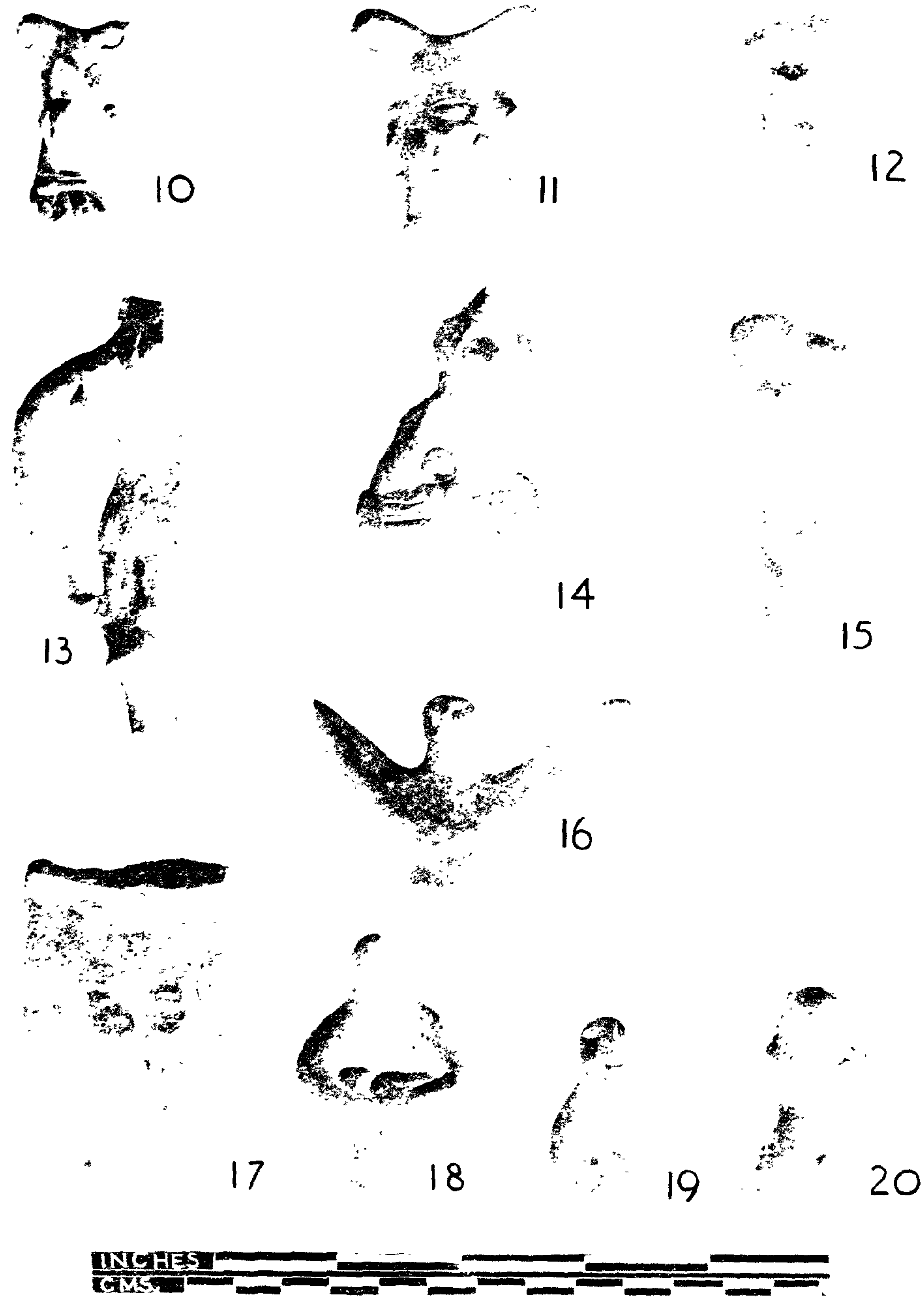
15. Crudely-modelled animal with long ears, possibly representing a donkey. The eyes are represented by incised pellets, mouth by a deep gash and nostrils by holes. From the cemetery-area, débris-layer.

16. Globular figurine, possibly human, with fan-shaped head-dress. It is analogous with Mackay II, LXXIII, 2. Unstratified.

17. Bearded head of a well-modelled ram. Nostrils and eyes represented by holes, and mouth by a gash. From the cemetery-area, débris-layer.



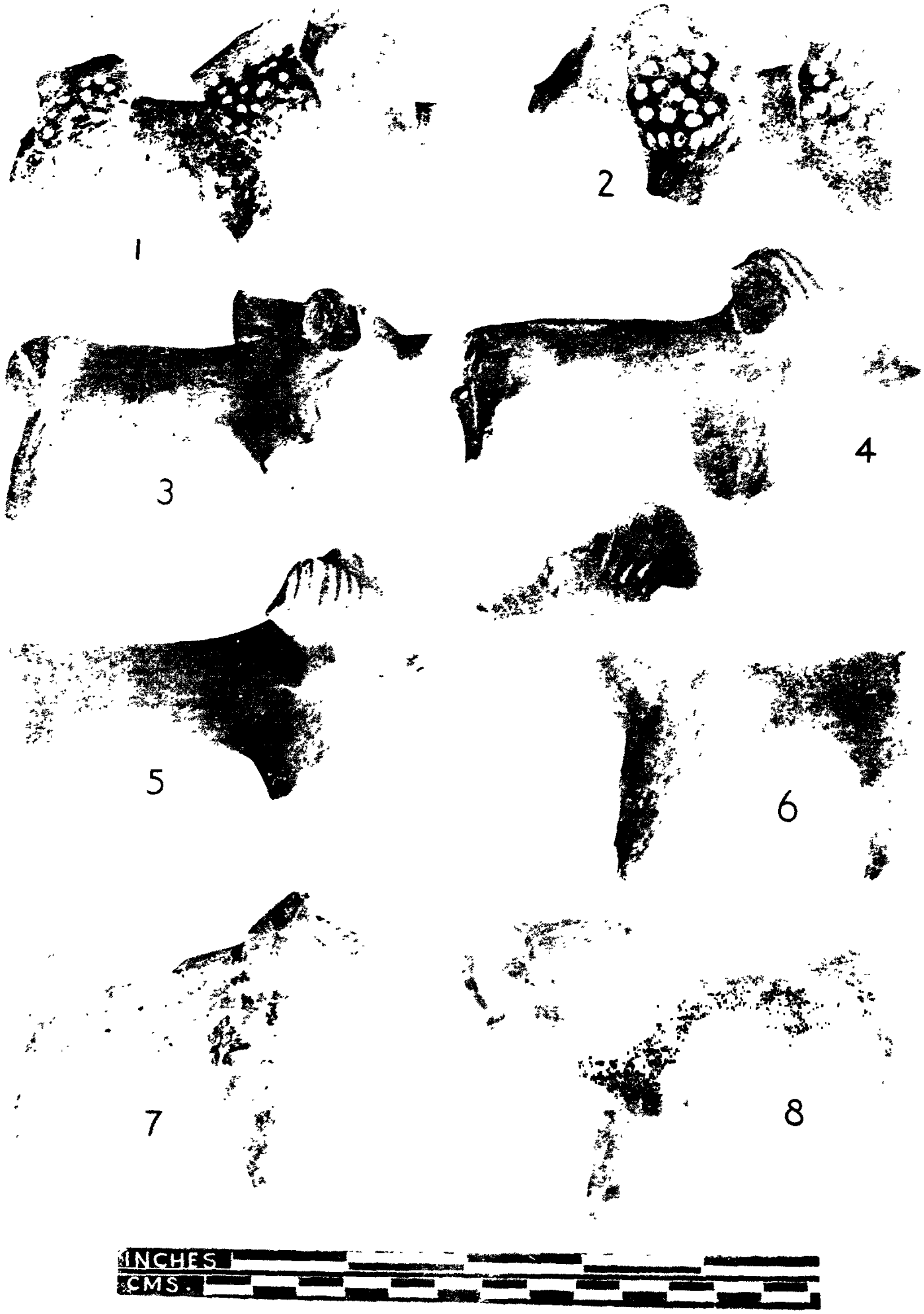
Terracotta figurines



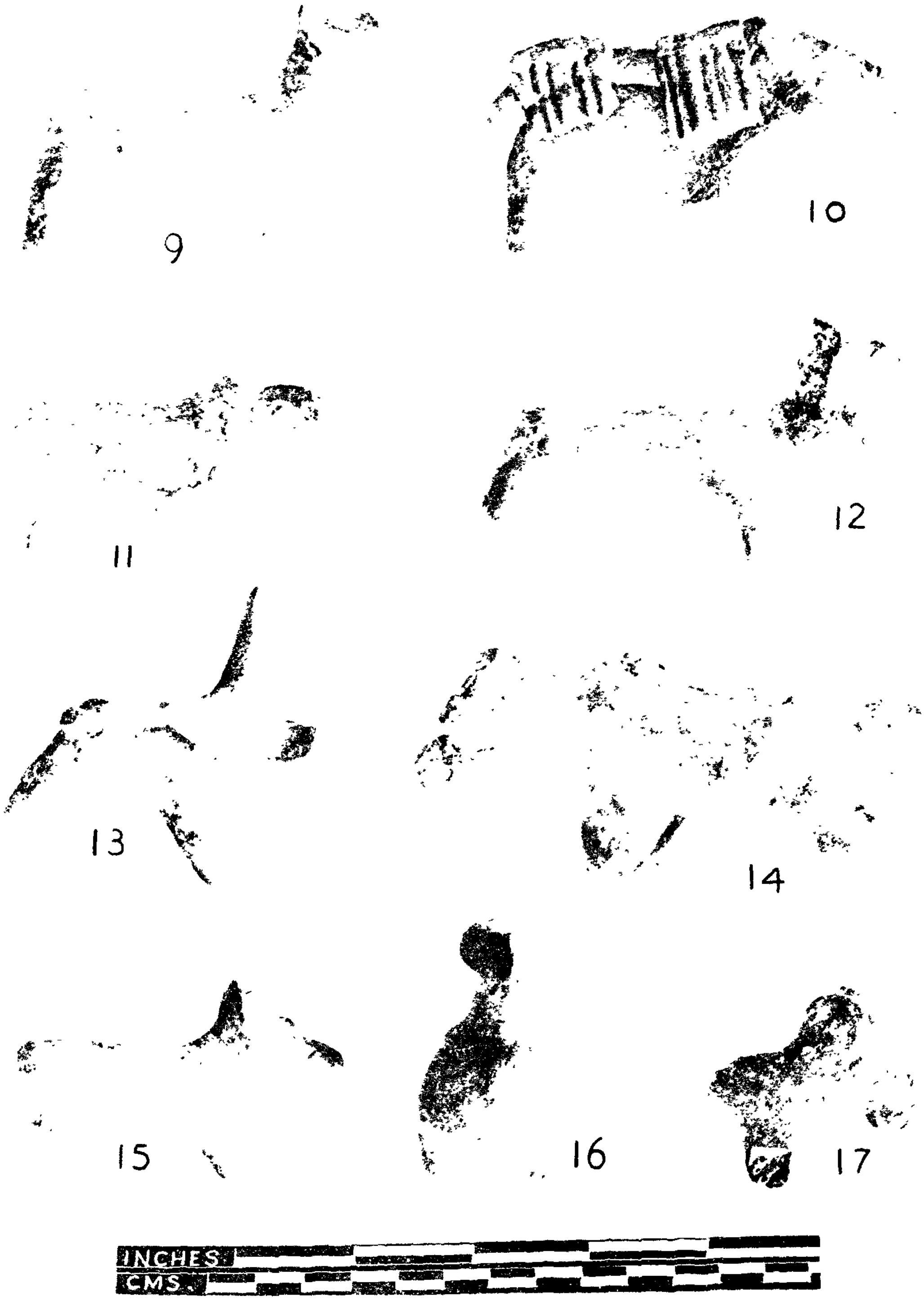
Terracotta figurines



Terracotta figurines



Terracotta figurines



Terracotta figurines

(iii) Other terracotta objects

The following miscellaneous terracotta objects are illustrated (pl. L B):—

1. Frame of a toy-cart with perforations for attachment. From the cemetery-area, débris-layer.
2. Similar but fragmentary. From HP XXX, make-up of the 'rampart'.
3. Mutilated wheel of a toy-cart, painted with black bands. From HP XXX, Period I on the platform.
4. Terracotta ring, possibly a net-sinker. From HP XXX, make-up of the 'rampart'.
5. Wheel of a toy-cart. From HP XXX, make-up of the 'rampart'.
6. Cone. From HP XXX, make-up of the 'rampart'.
7. Gamesman. From the cemetery-area, débris-layer.
8. Marble with vertically incised lines. Unstratified.
9. Gamesman. Unstratified.
10. Conical object with a rounded top, representing probably a phallus. It has a central shallow hole at the flat base. From the cemetery-area, débris-layer.
11. Large, thick ring probably representing a *yoni* (female principle). From HP XXX, Period IV on the platform.
12. Marble. From HP XXX, Period II on the platform.
13. Roughly spherical red-slipped rattle, perforated with three shallow holes. It is decorated all over with combed chevrons and painted with two brown bands. From HP XXX, pre-rampart layer.

APPENDIX B

Distribution of Harappā Pottery (fig. 1, p. 58)

Most of the pottery upon which this list is based is in the possession of the Archaeological Survey of India. It has recently been re-examined by Dr. Donald McCown, who has very kindly edited the following list. Sites marked with an asterisk have variant Harappan pottery. Doubtful sites are omitted.

1. Ahmadwālā, Bahāwalpur State. Unpublished.
2. Ali Murād—N. G. Majumdar, 'Explorations in Sind', *Mem. Arch. Sur. India*, No. 48 (Manager of Publications, Delhi, 1934), pp. 89–91.
3. Amri—N. G. Majumdar, *Mem. Arch. Sur. India*, No. 48, pp. 24–28.
4. Chabbuwālā, Bahāwalpur State. Unpublished.
5. Chak Pūrbāne Syāl—M. S. Vats, *Excavations at Harappā* (Manager of Publications, Delhi, 1940), I, 475-76.
6. Chanhu-daro—N. G. Majumdar, *Mem. Arch. Sur. India*, No. 48, pp. 35–38. E. J. H. Mackay, *Chanhu-daro Excavations* (Newhaven, Conn., 1943).
7. Charaīwālā, Bahāwalpur State. Unpublished.
8. Dābarkot—Aurel Stein, 'An Archaeological Tour in Waziristan and Northern Baluchistan', *Mem. Arch. Sur. India*, No. 37, pp. 55–64.
9. Daiwālā, Bahāwalpur State. Unpublished.
10. Damb Buthi—N. G. Majumdar, *Mem. Arch. Sur. India*, No. 48, pp. 114–120.
11. Derāwar, Bahāwalpur State. Unpublished.
12. Dhal—N. G. Majumdar, *Mem. Arch. Sur. India*, No. 48, pp. 125–27.
13. Diji-Ji-Tākvi—M. S. Vats in *Arch. Sur. India An. Report*, 1935-6, pp. 36-7.
14. Garakwālī II, Bahāwalpur State. Unpublished.
15. Ghāzi Shāh—N. G. Majumdar, *Mem. Arch. Sur. India*, No. 48, pp. 79–86.
16. Gorandi (*b*)—N. G. Majumdar, *Mem. Arch. Sur. India*, No. 48, p. 88.
17. Harappā—M. S. Vats, *Excavations at Harappā*, 2 vols. (Manager of Publications, Delhi, 1940.)
18. Jalhar, Bahāwalpur State. Unpublished.
19. Karchat—N. G. Majumdar, *Mem. Arch. Sur. India*, No. 48, pp. 129–131.
20. Khānpurī Thār, Bahāwalpur State. Unpublished.
21. Kotāsur—M. S. Vats in *Arch. Sur. India An. Report*, 1935-6, pp. 37-8.
22. Kotlā Nihang Khān (Rupar)—M. S. Vats, *Excavations at Harappā*, I, 476-77.
23. Kudwālā, Bahāwalpur State. Unpublished.
24. Lohri—N. G. Majumdar, *Mem. Arch. Sur. India*, No. 48, pp. 65–67, and 73–76.
25. Lohumjo-daro—N. G. Majumdar, *Mem. Arch. Sur. India*, No. 48, pp. 48–58.

*26. Mehī—Aurel Stein, 'An Archaeological Tour in Gedrosia', *Mem. Arch. Sur. India*, No. 43, pp. 154–163.
27. Mitha Deheno, Sind. Unpublished.
28. Mohenjo-daro—J. Marshall, *Mohenjo-daro and the Indus Valley Civilization*, 3 vols. (Arthur Probsthain, London, 1931); E. J. H. Mackay, *Further Excavations at Mohenjo-daro*, 2 vols. (Manager of Publications, Delhi, 1938).
*29. Nokjo-Shāhdīnzai—Aurel Stein, *Mem. Arch. Sur. India*, No. 43, pp. 152-3.
30. Pāndi-Wāhi—N. G. Majumdar, *Mem. Arch. Sur. India*, No. 48, pp. 91–95 and 109–114.
31. Rangpur—M. S. Vats in *Annual Report Arch. Survey of India*, 1934-5, pp. 34–38, pls. XII-XV.
32. Sandhanāwālā—Aurel Stein in *Geogl. Journal*, XCIX, No. 4 (London, 1942).
33. Shāhjo Kotiro—N. G. Majumdar, *Mem. Arch. Sur. India*, No. 48, pp. 137–39.
34. Shikhri, Bahāwalpur State. Unpublished.
35. Sutkāgen-dor—Aurel Stein, *Mem. Arch. Sur. India*, No. 43, pp. 60ff. The name is properly spelt as here written, and not 'Suktagen-dor' as originally published. Correction in Aurel Stein, *Archaeological Reconnaissances in North-Western India and South-Eastern Iran*, (London, 1937), pp. 70-1.
36. Thāno Buli Khān—N. G. Majumdar, *Mem. Arch. Sur. India*, No. 48, p. 142.
37. Trekoā Thār, Bahāwalpur State. Unpublished.

A NEW PREHISTORIC CERAMIC FROM BALUCHISTAN

By Stuart Piggott

An outstanding problem of prehistoric archaeology in India is that of the relationship of the Indus Valley and other early cultures with those of neighbouring tracts of Asia—Iran, Iraq, Afghanistan, the Turkestans. What, when and how did India receive from elsewhere? What was the nature and extent of her own contributions? Before we can begin to answer these questions, all of them vital to our evaluation of Indian civilization, much patient field-work and comparative analysis must be carried out by scholars of many countries working in close collaboration. Certain areas are geographically more likely than others to yield relevant information, and in this article Professor Piggott draws attention to the importance of the Quetta district as one of the major gateways into ancient India.

Introductory

THE prehistoric painted pottery which forms the most characteristic feature of the primitive village communities of Baluchistan in the second and probably the third millennium B.C. has been accessible in a more or less adequately published form to scholars unable to study it at first hand in the Central Asian Antiquities Museum in New Delhi for many years. Comparative work has been carried out by various orientalists, notably Frankfort and Childe, while I have myself attempted to assess the material against the contemporary cultures of Mesopotamia and Persia in two recent studies.[1] While working on the material in New Delhi in 1942–44 I found, in the reserve collections, a number of sherds from the Quetta region, partly collected by Hargreaves in 1925 and partly rescued from the excavations made when the Quetta Arsenal was constructed at the end of the last century, which seemed to constitute a distinctive series unrepresented by the published sites. I visited Quetta early in 1944 and was able to carry out a limited amount of field work in the immediate neighbourhood of the town by visiting the sites known by the place-names attached to Hargreaves' finds. I was able not only to add considerably to the bulk of sherds hitherto available for study, but also to describe the actual find-spots for the first time. These surface-finds confirmed the impression previously gained that here we had a culture with a well-defined ceramic style new to Baluchistan.

The salient features of this 'Quetta Ware', as I propose to call the pottery, were outlined in my discussion of the whole prehistoric western Indian pottery series in an earlier number of *Ancient India*, but the intrinsic value of the material renders it desirable to make a more detailed publication of the surface-finds which at present constitute our evidence for this new culture.

The Quetta Region and the Geographical Setting

The geographical situation of Quetta renders it a potential focus for movements of people from the west towards India, lying as it does in a wide upland valley mainly above the 5,500-foot contour and the head of the Bolān Pass, which gives access, through the eastern escarpment of the Baluchistan mountains, to the Indian plain immediately west-

[1] S. Piggott, 'Dating the Hissar Sequence—the Indian Evidence', *Antiquity*, XVII (1943), 169–182; and 'The Chronology of Prehistoric North-West India', *Ancient India*, No. 1 (1946), 8–26. Full references to previous works are given in these papers.

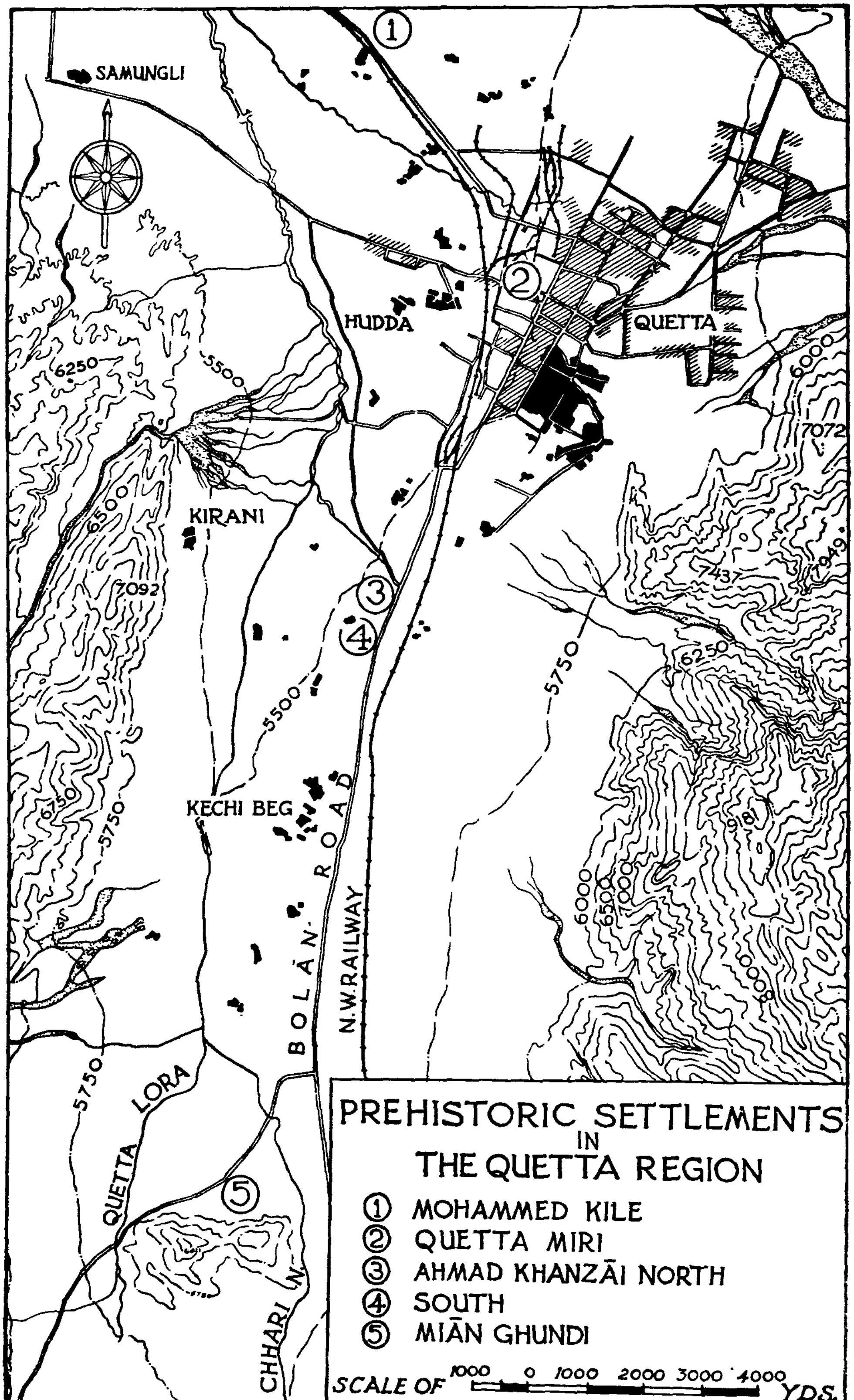
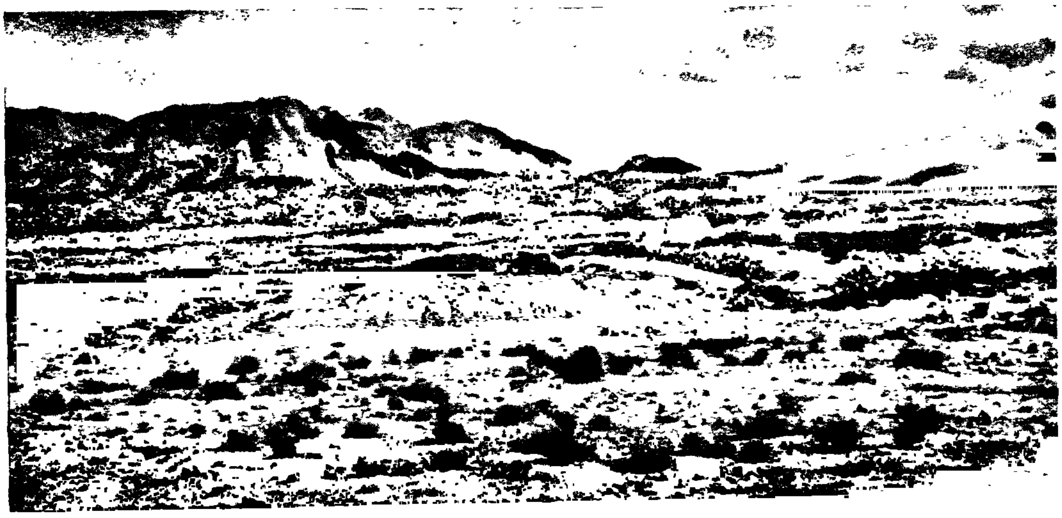

PREHISTORIC SETTLEMENTS IN THE QUETTA REGION
① MOHAMMED KILE
② QUETTA MIRI
③ AHMAD KHANZĀI NORTH
④ SOUTH
⑤ MIĀN GHUNDI
SCALE OF 1000 0 1000 2000 3000 4000 YDS.
SAMUNGLI
HUDDA
QUETTA
KIRANI
KECHI BEG
BOLĀN ROAD
N.W. RAILWAY
QUETTA LORA
CHHARI N.
6250
5500
6500
7092
6750
5750
6000
7072
7437
7949
9181

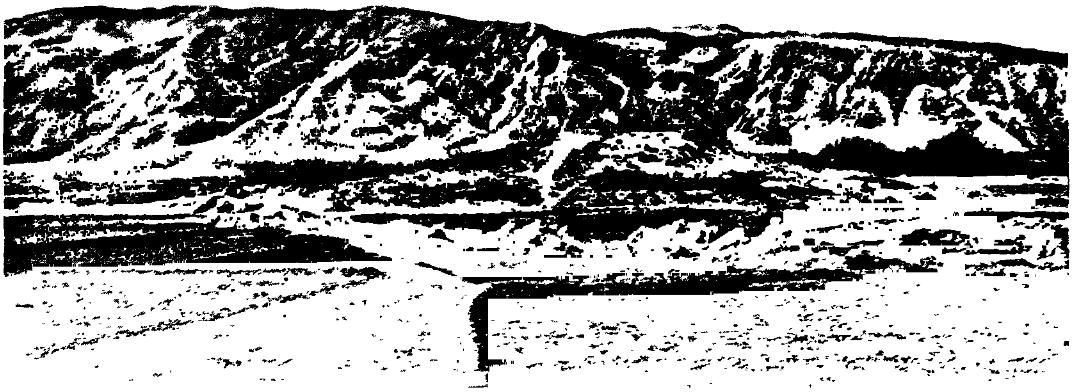
FIG. 1



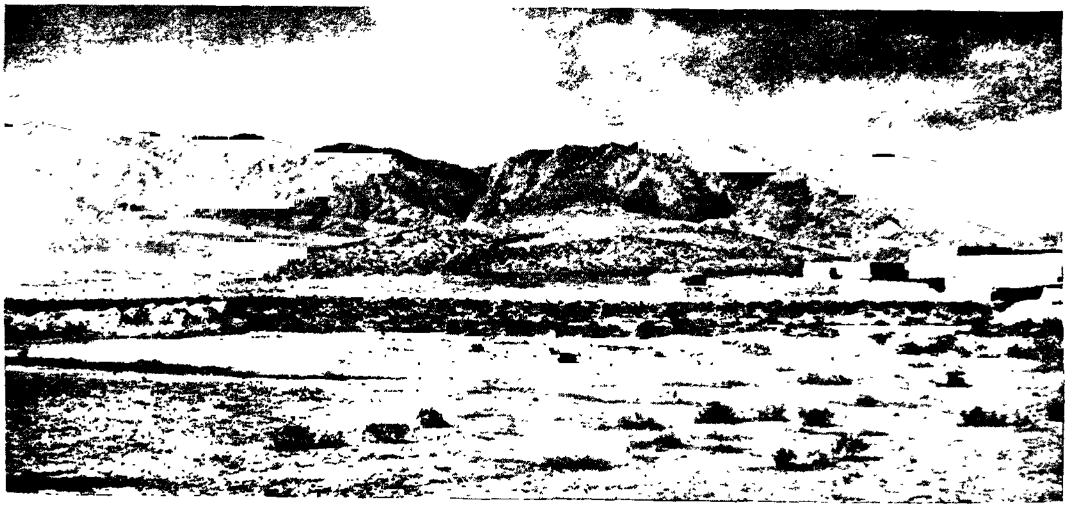
A. *Kile-Gul Mohammed Site*



B. *Ahmad Khanzāi North Site*



A. *Ahmad Khanzāi South Site*



B. *Miān Ghunḍi Site*

ward of the Indus river. Upon this pass there converge two natural routes from Iran, one to the north and the other to the south of the great desert areas of the Dasht-i-lut and the Dasht-i-Kevir.

The southern route, from the districts of Fars and the Makrān, would run mainly north-east up the Pishīn Lora valley, largely on the course of the modern railway line from Zahīdān on the Persian border to Sariab in the Bolān Pass, and a more or less parallel route eastwards through Kalāt and Mastung is also attested by archaeological evidence as in use in the third millennium B.C.

The northerly approach is a branch of the great west-to-east caravan route which by the middle ages had become the famous Silk Road that by however tenuous a link maintained trade-contact between China and the West. Archaeological evidence suggests eastward movement on this route at least to Anau, near Askābād in Russian Turkestan, by the fourth millennium B.C., and a route branching southwards from the main Silk Road towards the Helmund Oasis in Sīstān is implied about the middle of the second millennium by the finds at Nad-i-Ali in that region, comparable to those from the late cemetery at Sialk (Necropole B) and the final occupation of the ancient site of Anau (Anau III).[1] By classical times a branch route is recorded which turned south-east between Hekatompylos (near Damghan) and Antiocha Marghiana (Merv) and led to Alexandria (Kandahār). Only 150 miles south-east of Kandahār, the Bolān Pass is the obvious gateway to India.[2]

In such a region as the head of the Bolān Pass an interesting interaction of cultural currents might be expected in prehistoric times, but by some curious accident practically no fieldwork seems to have been carried out in this very easily accessible part of Baluchistan except for Hargreaves' visit of twenty years ago. What we know of archaeological distributions in the Baluchi hills is almost entirely derived from the results of the late Sir Aurel Stein's journeys, the first exploring the Zhob valley lying to the north-west of Quetta and the second the valleys of the South Baluchistan hills from the shores of the Makrān to as far north as Nāl, which is just over 100 miles south of the Bolān Pass. The intermediate region, approximately centred on Kalāt, has remained largely unexplored.

On the basis of Stein's discoveries, and those of Majumdar in Sind, we can distinguish several regional cultures which, in the light of the recent Iranian evidence correlated by McCown, can be divided into two broad divisions, Red Ware and Buff Ware. I have already discussed these subdivisions of the Baluchistan cultures in my earlier paper in *Ancient India*,[3] to which the reader is referred for an appreciation of the archaeological background against which we must set the new Quetta finds.

The Sites (pls. LXI and LXII)

Four of the five sites marked on the map (fig. 1) were visited in 1944 and from all of them potsherds were collected from the surface. One site, however, that of the Quetta Miri (or Fort), is now occupied by the Arsenal and one has for study only the sherds collected during the years following 1887 in the progress of the excavation and building work on the site. The sherds from this site, together with those from Sites 3, 4 and 5, constitute a

1 R. Ghirshman, 'Fouilles de Nad-i-Ali dans le Seistan Afghan', *Revue des Arts Asiatiques*, XIII (1939), 10–22. Trial excavations in the Sohr-dagh 'tell' revealed a massive brick-platform, and the pottery included a fragment of a spouted vessel of grey ware of the well-known Hissar III-Anau III type and a large pithos of the type of Pumpelly, *Explorations in Turkestan*, I, pl. 10, 1; pl. 19, 1, 2 from Anau III.

2 For these routes in early historic times see S. A. Huzayyin, *Arabia and the Far East* (Cairo 1942), with references.

3 *Ancient India*, No. 1 (1946), pp. 8–26.

completely homogeneous group: Site 1 yielded some sherds assignable to the same group but in addition a preponderance of forms whose affinities lie with the Zhob Culture.

Site 1

This has been named from the nearest hamlet, Kile Gul Mohammed, and was found by me for the first time. It lies on the north side of the road from Quetta to Baleli, by the fourth milestone. It consists of a low irregular stony mound at spot-level 5,376 feet, partly occupied by a Muslim cemetery. The mound does not appear to be wholly an artificial 'tell' as do the other sites visited, and the sherds are sparsely scattered at the foot of the mound on the south. Most of these sherds can be matched from such sites as Moghul-ghunḍai in the Zhob valley, being buff wares with black painted ornament in a characteristic 'miniature' style, with plum-red as an auxiliary colour, but a few sherds seem to fall into the same class as those from the other sites to the south. The Zhob Ware sherds have not been illustrated here.

Site 2

The Quetta Miri site is now represented by a collection of sherds which were in the McMahon Museum at Quetta and were transferred with the remainder of the collections to the Central Asian Antiquities Museum in New Delhi after the 1935 earthquake.[1] This pottery is presumably that found from 1887 onwards in constructing the Arsenal that now occupies the site of the Miri, which was clearly a fort built on the summit of a 'tell' formed by accumulated occupational débris, and, excluding a group of glazed Islamic sherds and another of coarse painted wares comparable with others from local sites known to be early historic, the prehistoric material is exactly analogous with that from the sites described below.

Sites 3 and 4

These I have named Ahmad Khanzāi North and South, from the adjacent fruit-farm. The existence of this site was inferred from a collection of sherds in the C.A.A.Museum among material brought back from Baluchistan by Hargreaves and labelled with this place-name.[2] I found there two 'tells', the northern about 12 feet high and 200 feet in diameter and apparently consisting of loamy clay with few stones, suggesting the remains of mud-houses. There were abundant sherds of pottery, consistently of the 'Quetta' type. The southern site was another 'tell' of approximately the same diameter but twice as high, and with a Muslim cemetery encroaching on the mound on the north. Sherds occurred, but not in abundance, and there was a stony surface to the mound.

Site 5

This site is named Miān Ghunḍi, and from the large 'tell' on the site an adjacent home-stead and the levy-post take their name. Hargreaves had collected sherds from here, and I was led to the site by his labels in the C.A.A.Museum. It proved to be an impressive 'tell' at least 600 feet in diameter and from 45 to 50 feet high. The surface was rather stony but the material of the mound exposed by some recent digging on the summit and on the western side was loam, presumably representing decomposed mud-walls. Sherds of characteristic 'Quetta' pottery were abundant.

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[1] *Journ. Asiatic Soc. Bengal*, LVI (1887); *Baluchistan District Gazetteer*, V—*Quetta-Pishin* (1907), pp. 45-46.

[2] No mention is made of Ahmad Khanzāi or of Miān Ghunḍi in Hargreaves' notes on fieldwork in the Quetta region published in *Annual Report Arch. Survey of India, 1925-26*, pp. 59–64.

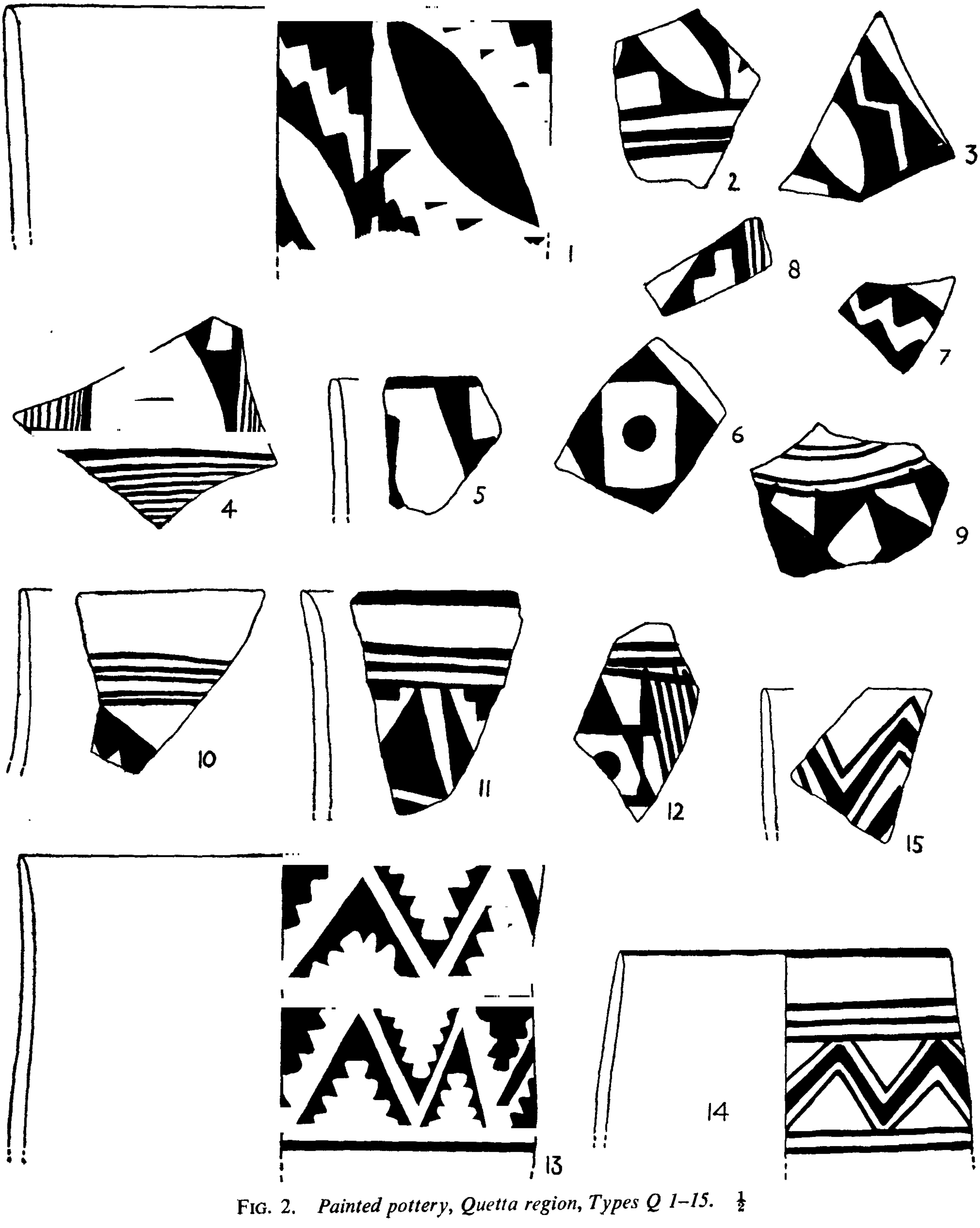


FIG. 2. *Painted pottery, Quetta region, Types Q 1–15.* ½

It is remarkable that these sites, all of them lying within sight and easy access from a main tarmac road a few miles outside Quetta, should have been unrecorded until now, as I can trace no published notes of Hargreaves describing them and his labels in the Museum give no hint of the character of the sites which yielded the sherds. They obviously call for accurate scientific excavation at some future date: the northern 'tell' at Ahmad Khanzāi should give the characteristic culture relatively pure and easily accessible to the excavator, while the large Miān Ghuṇḍi mound must have a latent stratigraphical content of immense potentialities, especially if the Quetta Ware on the surface does in fact represent only the latest occupation of the site. As will be seen in the ensuing discussion of the pottery, it forms a group with well-marked links not only with the Iranian Buff Ware cultures to the south and west but with significant hints of connection with the Turkestan site of Anau to the north-west. Excavation at one or more of the Quetta sites should not only give precision to a new culture which I have assumed, on what seems to me reasonable evidence, to be implied by the surface-finds of sherds, but would also throw light on the interactions of the Buff Ware and Red Ware cultures at their easternmost point of contact.

THE POTTERY AND ITS ANALOGUES

The assemblage of sherds from Sites 2 to 5, with a minority from Site 1, present so uniform a series that I have no hesitation in grouping them as products of a single culture although none derives from a closed stratum in a scientific excavation. In the illustrations in figs. 2 to 6, therefore, the sixty or so sherds have not been differentiated into their separate sites but are treated as a single group of surface-finds.

The ware is normally well-baked, probably but not in all instances certainly hand-made without a fast wheel and (with exceptions noted below) varies from cream or pinkish colour with a white slip to the characteristic greenish from over-baking (as e.g. in Al 'Ubaid ware). The whitish slip on the pink sherds is a thin wash but normally the surface colour is that of the body of the sherd. The surface is smooth but matt, and the 'black' paint used may thin out to a polish brown, but there is never any trace of a second colour, the few black-and-red sherds from Kile Gul Mohammed being quite distinct with their obvious Zhob Ware affinities. A few exceptional sherds are of very good hard grey ware with black painted designs: both the examples illustrated (Nos. 60 and 61) are from the base of shallow bowls and come from Miān Ghuṇḍi and Quetta Miri respectively. There is another sherd of this ware (not illustrated) from Ahmad Khanzāi, so it appears a concomitant of the normal buff ware on all sites.

The local analogues of the Quetta assemblage are not precise, though the buff wares of Amri and those without red slip at Sur Jangal come nearest, while the (as yet unpublished) pottery found by Stein in 1941 stratified below Harappā Ware by the Ghaggar (Sarasvatī) river also seems comparable in general terms.[1] Shāhi-Tump has the association of buff and grey wares, and also the shallow bowls which are not found in Amri nor the Zhob valley series (with exceptions noted below), but the overfired, almost metallic, quality of much of the pottery precludes comparison, and the distinctive quality of the painting, with a very fluid pigment applied to a porous surface with a soft brush so that the edges of the design 'run' and are blurred, is totally different from the crisp edges of the incisive brush-work of the Quetta potters, nor are the similarities in ornament more than shares in the common stock-in-trade of the buff-ware potters. It is however important to note that fine grey-ware sherds of a type very similar to that from Quetta occurred at Sur Jangal

[1] Preliminary report on the expedition in *Geog. Journ.*, XCIX (1942), 173–182.

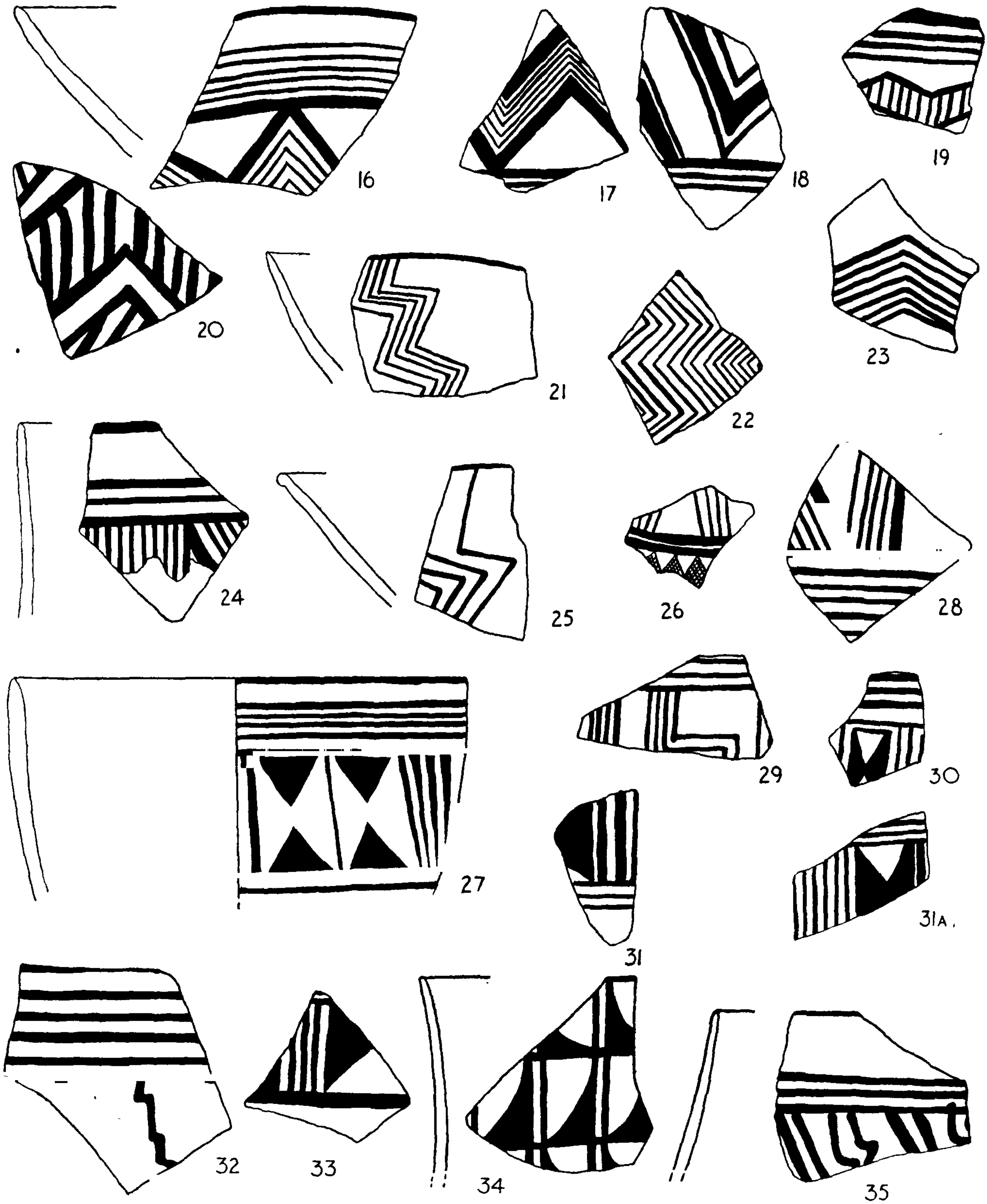


FIG. 3. *Painted pottery, Quetta region, Types Q 16–35.* ½

apparently associated with the buff and red-slipped wares. These grey-ware sherds all appear to come from shallow bowls, and the design on one of these[1] parallels that on Quetta No. 59, though the Quetta bowl is of normal buff ware in this instance.

In order to relieve the text of documentation, I have adopted the form of a tabular Appendix to indicate parallels to the Quetta types from sites outside Baluchistan, and the reader should turn to this for specific references to points in the ensuing commentary on the significant analogies that may be detected between Quetta and wares which, particularly in Persia, have been found in stratified contexts which permit of their relative dating.

Of the patterns represented in the Quetta series the most significant seem the *diagonal stepped motif* represented by Q 1–Q 8, Q 10-Q 11, Q 13 and Q 60, associated in some examples (Q 1–Q 4) with an *oblique oval* element. These motifs, in isolation or together, are by no means common in the Buff Ware province at large, but they occur with great frequency at Tal-i-Bakūn in Fars province, near the site of Persepolis, and sporadically at other sites in Fars. The diagonal stepping occurs quite recognizably in Susa I and in Musyan, and again in Giyan V and in Sīstān. An interesting example, to which reference will be made again, is that from Anau II. The *thick-and-thin chevrons* of Q 14–Q 18, while common in Susa I, seem curiously enough absent elsewhere, and the *vertically-hatched chevron* (Q 19-Q 20) occurs in Fars and in Giyan V. The *thin chevronny or zig-zag* line (Q 21–Q 23 and Q 25) appears at Tal-i-Bakūn and other Fars sites, in Susa I and in Giyan V and Sīstān. The 'butterfly' or *opposed triangles* pattern (Q 27, Q 30-Q 31*a*, Q 33) is one very common in the Buff Ware province, appearing at Al 'Ubaid, in Fars, in Susa I and Musyan, in Giyan V and in Sīstān. These latter motifs are less distinctive, and the same applies to the *thin-line step* pattern as in Q 29 and Q 32, which occurs in Tal-i-Bakūn, Susa I, Musyan and Sīstān.

The *diagonally-divided squares* of Q 34, well-known from Al 'Ubaid, appear at Tal-i-Bakūn, Fars, Musyan and Giyan V, while of the group of patterns between Q 35 and Q 45 little is distinctive save the *degenerate thin-line step* known from Tal-i-Bakūn and Al 'Ubaid, and, in derivative form with other Buff Ware motifs, much stylized, at Nāl in Baluchistan.

The *stemmed goblets* represented by Q 46 and Q 47 (the latter a fragment of the tubular stem with painted bands) are difficult to parallel save at Sialk III and Giyan V, where the type occurs in very similar form, and the fragment of a *perforated foot-stand* of a bowl (Q 48) is remarkable, though similar triangular perforations are known from Samarra and also at Musyan, and the cross-hatching occurs at Tal-i-Bakūn and elsewhere in Fars. Of the remaining patterns and types other than the shallow bowls, the curious design on Q 50 might be related to some from Tal-i-Bakūn, but in its imperfect form it is difficult to judge: the *tree* of Q 56 is certainly paralleled at that site. The alabaster cups (Q 57 and Q 58) belong to forms known from most Buff Ware sites, especially Susa I and Musyan: the simple type of Q 58 is also found at Shāhi-Tump. The forms represented by the foregoing sherds seem mainly (with the exception of the stemmed goblets and the globular pot implied by Q 51) to come from beakers of sub-carinated forms sloping slightly inwards to the mouth (e.g. Q 14) common throughout the Buff Ware sites from Iraq to Baluchistan.

The *shallow bowls* of Q 59 to Q 61 are interesting in view of their absence in Baluchistan, save at Shāhi-Tump and exceptionally at Sur Jangal, but they are well represented in Sīstān, with characteristic cruciform-patterns inside, and are of course well-known from Fars to Susa. The parallel for the design on Q 59 from Sur Jangal has already been cited, and the white-on-black stepped motif of Q 60 finds a parallel from Tal-i-Bakūn, where there also occurs the *coarse fringed band* of Q 59. Something analogous to this also occurs

[1] A. Stein, *Arch. Tour in Waziristan and North Baluchistan*, pl. XX, S.J. v. 17. There are other similar unpublished sherds.

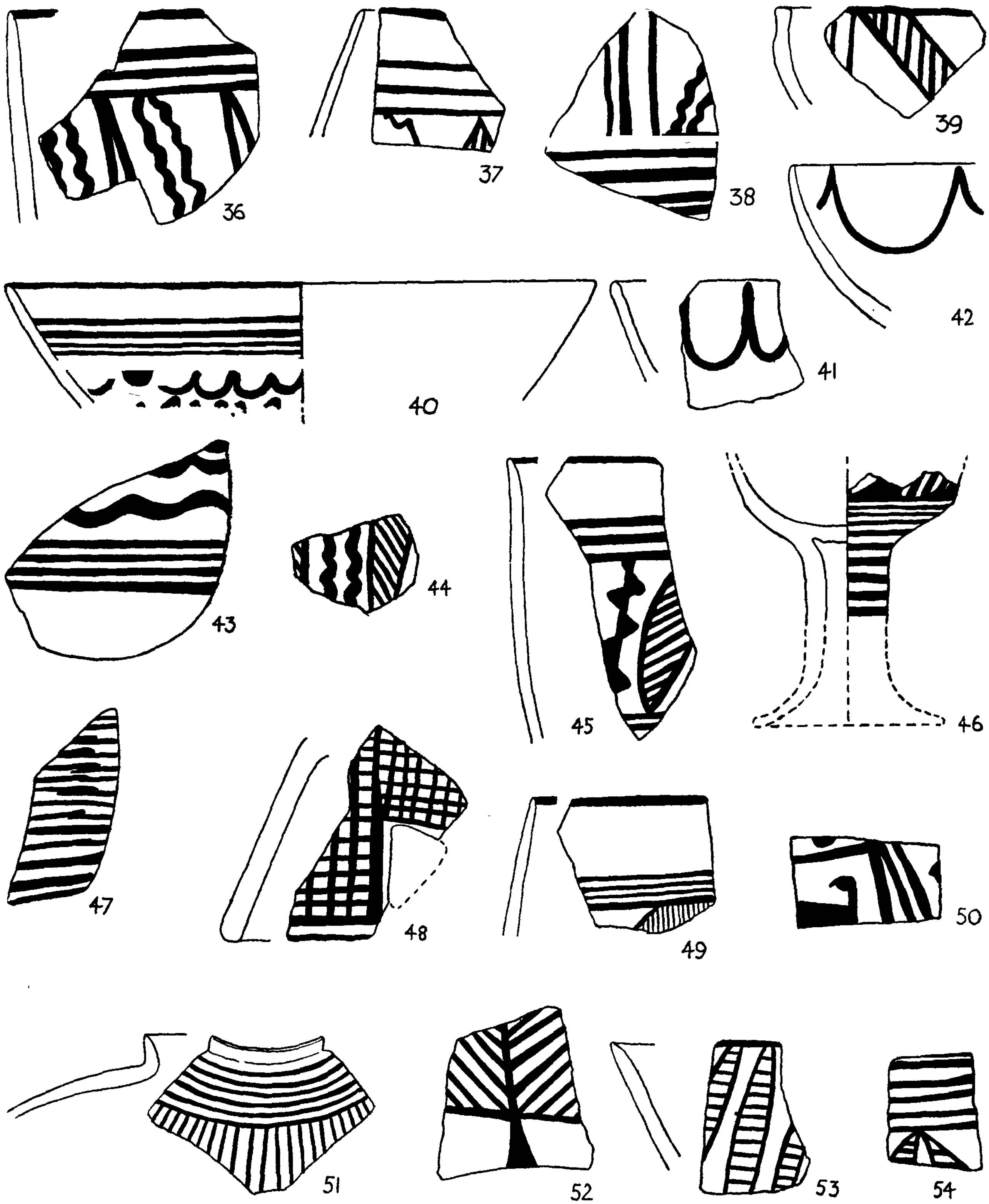


FIG. 4. *Painted pottery, Quetta region, Types Q 36–54.* ½

elsewhere in Fars as well as in Sīstān, and again at Mohamedabad not far from Anau, and at Anau III itself. The *coarse zig-zag* of Q 61 is again paralleled at Tal-i-Bakūn.

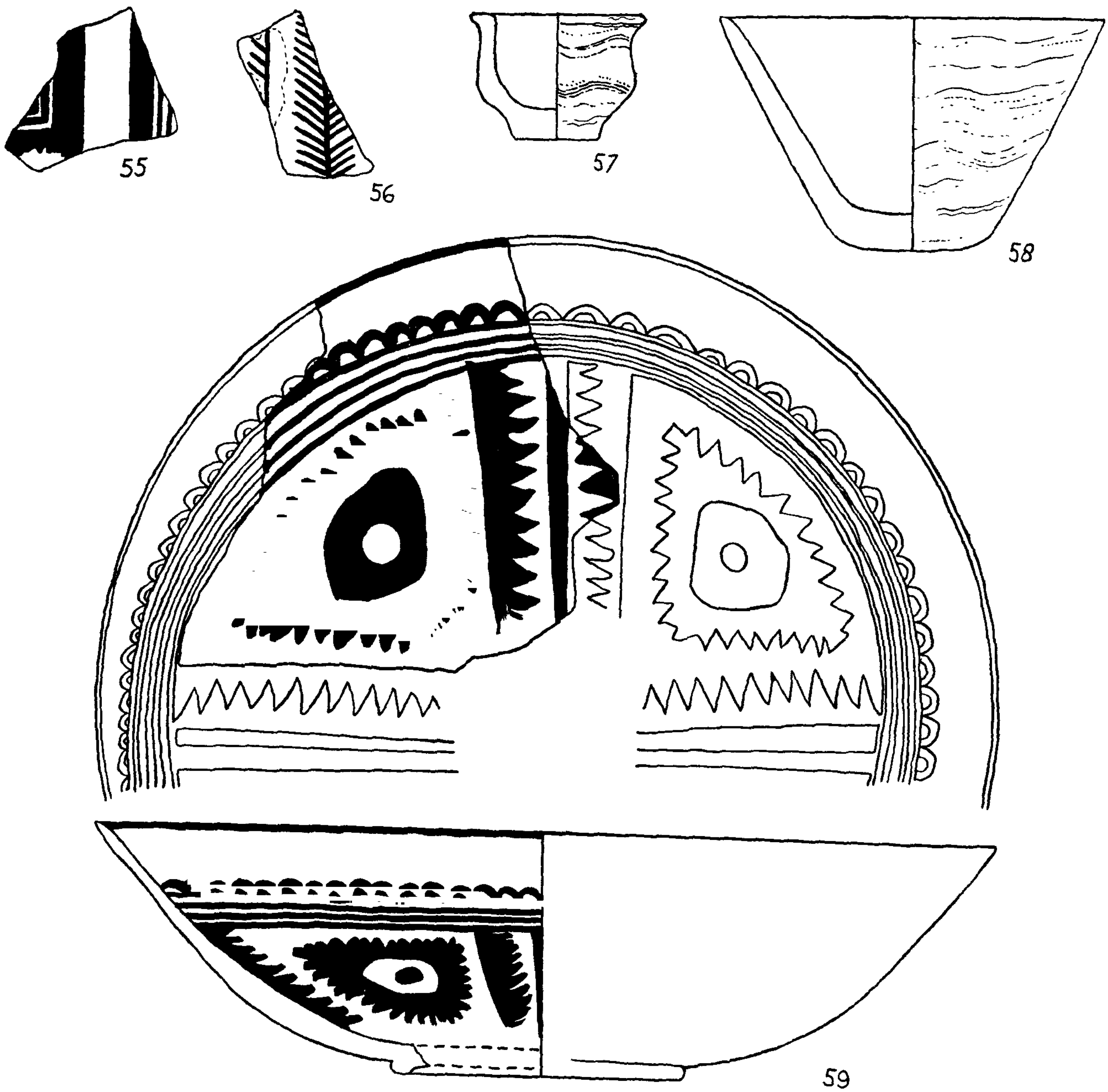


FIG. 5. *Painted pottery, Quetta region, Types Q 55, 56, 59; alabaster vessels 57, 58.* $\frac{1}{2}$

It will be seen that Quetta Ware is definitely a member, a regional variant, of the Buff Ware culture as seen in other variant but basically connected sites, notably Tal-i-Bakūn and other sites in Fars and Elam, but also with links at Giyan V and Sialk III. The parallels cited which derive from stratified sites all indicate an approximately contemporary chronological horizon, though the danger of regarding this as anything more than a *terminus a quo*, possibly remote from the actual date of the pottery at Quetta, is one against which the

student of the Baluchistan cultures has to be constantly vigilant. But there is another piece of evidence to be examined, touched on above.

In discussing the pottery from the 15-foot deposit constituting the second cultural phase of Anau in Russian Turkestan, McCown notes 'evidence of a significant change between Anau I and II, which proves the appearance of a new cultural element'.[1] Among the features suggesting such an innovation is the appearance of two novel types of ware—one monochrome on an unslipped buff ware, or on a slip that may be whitish green or a strong burnished red, and the other polychrome (black and red) on buff pottery. McCown considers a connection of the monochrome painted buff ware with that of Anau I possible, but notes that the patterns in general seem allied to the Buff Ware Iranian group rather than to Red Ware (derivative Chesme Ali) of Anau I. Now among these patterns the most outstandingly original is a sherd with stepped ornament, painted in black on unslipped buff ware, that is completely analogous to Q 1–Q 8. This significant sherd seems to give some precision to the regional variant of the Buff Ware culture most likely to have influenced the Anau II culture, especially when taken in conjunction with the red-slipped and polychrome sherds which McCown perceived as in all probability pointing to Baluchistan. A map shows how the vast unexplored area of Afghanistan intervenes between Anau and Quetta—an area which should yield intermediate sites strung out along the route which, as I have indicated above, was already well-established in early historic times from Merv to Kandahār. Should more definite evidence be found of connections between the two regions in Anau II times, it would only anticipate the influences perceptible in the beginning of the second millennium B.C. between Anau III and western India after the collapse of the Harappa empire.

We are now in a position to sum up our evidence based on a comparative study of the Quetta sherds. So far as Baluchistan is concerned, their outstanding distinction is that

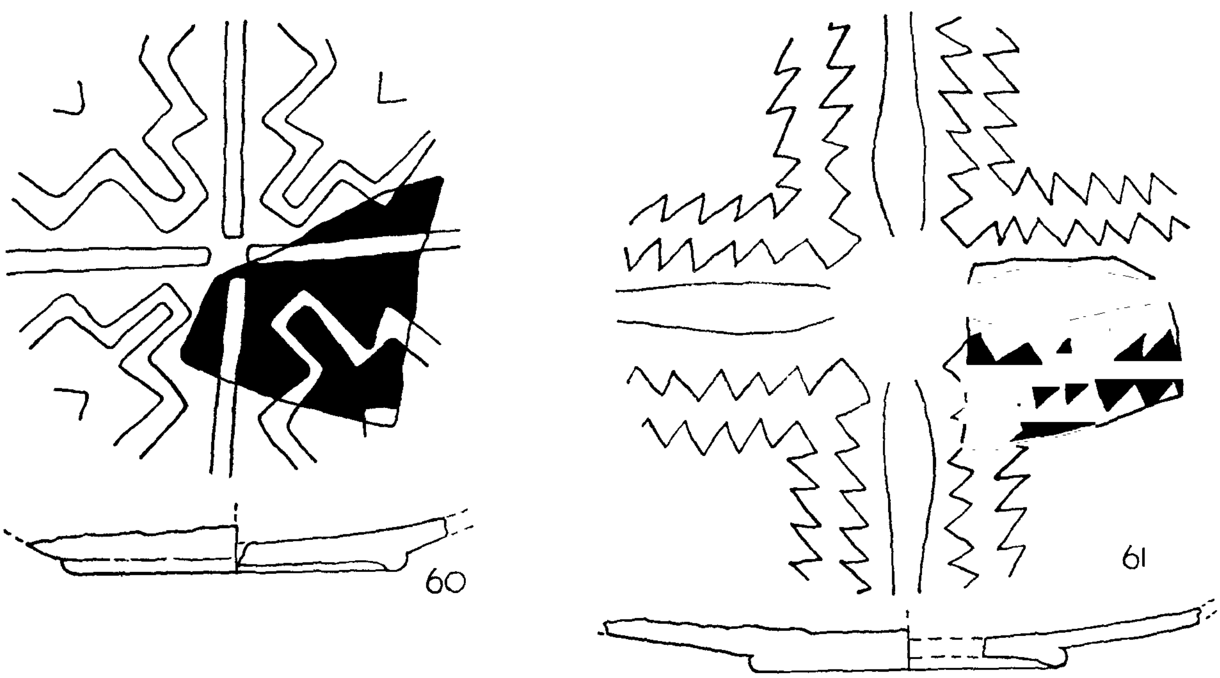


FIG. 6. *Painted pottery, Quetta region, Types Q 60-61 (shallow bowls with internal ornament).* ½

[1] D. McCown, *Comparative Stratigraphy of Early Iran*, p. 57.

of being a monochrome black-on-buff ware with a large free style of ornament: qualities found elsewhere in this region only at Shāhi-Tump and immediately outside Baluchistan, in the Sīstān sites. It is important to decide the relationship of Quetta Ware to these sites: with Shāhi-Tump only such undifferentiated features as the presence of shallow bowls with cruciform ornament or the sub-conical alabaster cups common to most of the manifestations of the Buff Ware culture serve as a link, while the technique of painting is really different at the two sites. In Sīstān, certain parallels in ornament can be quoted, some (e.g. fringed or dentated lines) rather specialized, but as a group the two series cannot be placed together. It is important to make this distinction clear, because one's first instinct is to class Quetta Ware as a late archaistic survival of the Buff Ware culture on its easternmost periphery, as so much of the Baluchistan Buff Ware seems to be. In Shāhi-Tump, Sīstān and the Bampur sites [1] we have evidence of just such a survival of the Bakūn-Fars culture into Early Dynastic or (as at Shāhi-Tump) even later times, and the fact that the Quetta sherds do not as a whole compare with the material from these sites increases one's confidence in the comparative antiquity of the former, and give reality to the apparent strong similarities with Tal-i-Bakūn we have noted.

On the other hand, the shallow bowls of thin hard grey ware from Quetta and from Sur Jangal may give an important clue to relative chronology, since the Sur Jangal ware as a whole seems definitely parallel with that of Hissar I, probably mainly contemporary with the end of that phase. If then Quetta Ware can be regarded on this showing as likely to be the equivalent of late Hissar I in date, the chronological implications we have seen suggested by parallels on such sites as Tal-i-Bakūn or Giyan would be precisely in accordance with McCown's correlations of these sequences, and the buff ware with stepped ornament would equally conveniently make its appearance in Anau II in precisely the required chronological context, a little after Hissar I. These synchronisms, attractive though they appear, must not however be given too much weight in assessing the position of Quetta Ware—we have after all only some sixty sherds, all of them surface-finds, to serve as a basis for our deductions. But even with these reservations it is I think permissible to suggest that we have, on the Quetta sites, evidence implying a local variant of the Iranian Buff Ware group of cultures which probably flourished at a time contemporary with Hissar I, Giyan V, Sialk III, Susa I, Tal-i-Bakūn A and Al 'Ubaid (fourth millennium B.C.)—a tentative suggestion which excavation of the sites alone can confirm or refute.

My thanks are due to Mr. A. P. Orme for the site map (fig. 1), based on Survey of India maps.

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[1] A. Stein, *Arch. Reconnaissances in N.-W. India and S.-E. Iran*, pp. 104ff.

	Tal-i-Bakūn and other Fars sites	*Susa I and Musyan Sites*	*Giyan, Sialk, Anau, Sīstān, etc.*
Diagonal stepped motif, with or without oval elements (Q 1–Q 8, Q 10-Q 11, Q 13, Q 60).	*Tal-i-Bakūn*: TBA, pl. 43, 7; 33, 14; 24, 8 (cf. Q 3); pl. 49, 14; 51, 1 and 13; 54, 14, etc.; pl. 62, 8 (oblique stepping); pls. 63–65 (oblique ovals). *Tal-i-Bakūn*: Herzfeld, IAE, fig. 29; fig. 52; pl. V (lower); pl. VIII bottom left (cf. also Q 60). *Tal-i-Regi, Tal-i-Siyah*: ibid., fig. 29; Stein ATAP, pl. XXI, 24 (Tal-i-Regi). *Malamir*: Stein, ORWI, pl. II, 5 and perhaps 19.	*Susa*: MDEP I, pl. XVIII, 12: ibid., XIII, pl. VI, 6 (dubious), pl. VIII, 4. *Mourad-abad*: MDEP VIII, fig. 151.	*Giyan V*: FTG, pl. 42, second row right, third row left (cf. also Q 60); ibid., pl. 50, third row right (not very closely comparable). *Anau* II: Pumpelly ET, fig. 135, pl. 32, 1. *Sīstān*: Stein, IA, pl. CXIII, SS. 04. 8.
Thick-and-thin chevrons (Q 14–Q 18).	*Chigha-pahan*: Stein, ORWI, pl. XII, 3.	*Susa*: Common—e.g. MDEP XIII, pls. I, IV, V, VI, VII, VIII, X.	
Vertically-hatched chevrons (Q 19-Q 20).	*Tal-i-Skau*: Stein, ATAP, pl. XXIV, 4. *Chigha-pahan*: Stein, ORWI, pl. XI, 3. *Kozagaran*: ibid., pl. VII, 23.		*Giyan V*: FTG, pl. 43, top row No. 5.
Thin chevronny or zig-zag line (Q 21–Q 23; Q 25).	*Tal-i-Bakūn*: Herzfeld, IAE, pl. XIII (top), TBA, pl. 32, 2, 4; pl. 24, 15. *Malamir*: Stein, ORWI, pl. II. *Chigha-pahan*: ibid., pl. XII, 14. *Tal-i-Regi*: Stein, ATAP, pl. XXI, 4; pl. XXVI, 25. *Qal'a-i-Sardagagh*: Stein, AR, pl. IX, Sar. 1. *Katukan*: ibid., pl. XI, Kat. 4. *Chah Husaini*: ibid., pl. XIX, Hus. 127. *Tal-i-Iblis*: ibid., pl. XXIV, 40, etc.	*Susa*: MDEP XIII, pl. II, 4: pl. VI, 5; pl. VIII, 1; pl. IX, 5, 9.	*Giyan V*: FTG, pl. 45, top row No. 5; pl. 56, top row No. 4. *Sīstān*: Stein, IA, pl. CXIII, top pl. CXIV, SS. 05.
Opposed triangles (Q 27, Q 30-Q 31*a*, Q 33).	*Kozagaran*: Stein, ORWI, pl. VII, 16, 19. *Chigha-pahan*: Stein, ORWI, pl. XII, 7. *Chah Husaini*: Stein, AR, pl. XIX, Hus. 490.	*Susa*: MDEP XIII, pl. IV, 1, 2: pl. V, 8, 9, etc.; pl. VI, 2 (cf. Q 27). *Musyan*: MDEP VIII, fig. 155.	*Giyan V*: FTG, pl. 47, third row No. 3; pl. 52, bottom row last two. *Sīstān*: Stein, IA, pl. CXIV, KG. 08.
Thin-line step (Q 29 and Q 32).	*Tal-i-Bakūn*: Herzfeld, IAE, fig. 45.	*Susa*: MDEP XIII, pl. V, 9; pl. VIII, 6. *Musyan*: MDEP VIII, fig. 165.	
Diagonally-divided squares (Q 34).	*Tal-i-Bakūn*: TBA, pl. 26, 6; pl. 37, 1; pl. 49, 21; pl. 59, 8. *Kamakan*: Herzfeld IAE, fig. 66.	*Musyan*: MDEP VIII, figs. 160–163. *Khazineh*: ibid., fig. 264.	*Giyan V*: FTG, pl. 45, top row No. 2.
Degenerate thin-line step (Q 35–Q 38).	*Tal-i-Bakūn*: TBA, pl. 34, 5; pl. 32, 1.		
Stemmed goblets (Q 46-Q 47).			*Sialk III*: FTS, pl. LXXI. *Giyan V*: FTG, pl. 58.
Perforated foot-stand with cross-hatching (Q 48).	Cross-hatching—*Tal-i-Bakūn*: TBA, pl. 67, 11, etc.; pl. 66, 7. *Tal-i-Pir, Haraj*: Stein, AR, pl. XXIX.	Triangular openings—*Musyan*: MDEP VIII, figs. 278-279.	
Possible angular spiral (Q 50).	*Tal-i-Bakūn*: pl. 33, 11; pl. 59, 11 (possibly allied).		
'Tree' (Q 56).	*Tal-i-Bakūn*: TBA, pl. 45, 2; pl. 37, 2.		
Coarse fringed band (Q 59).	*Tal-i-Bakūn*: TBA, pl. 33, 6, 16; pl. 34, 1; pl. 35, 10; pl. 45, 7 (triangle with circle); pl. 56, 8, 9.	*Musyan*: MDEP VIII, figs. 158–159.	*Anau III*: Pumpelly ET, pl. 35, 2, 3, 5. *Mohamedabad*: Hall, *Royal Asiatic Soc. Cent. Suppl.* 1924, pls. XV, XVI; Frankfort, *Studies* I, fig. 9, pl. VII. *Sīstān*: Stein, IA, pl. CXIII, RR. xvii. 08; SS. 074; Machi 010.001. *Bampur*: Stein, AR, pls. VII, VIII, (All above derivative and not strictly comparable).
White-on-black steps (Q 60).	*Tal-i-Bakūn*: TBA, pl. 25, 14; pl. 39, 5. Cf. *Tal-i-Regi, Khusu*: Stein, ATAP, pl. XXV, 42.		
Coarse zig-zag (Q 61).	*Tal-i-Bakūn*: TBA, pl. 55, 1 and 2.		*Sīstān*: Stein, IA, pl. CXIII, SS. 050; SS. 015; SS. 066.

***Abbreviations*:—**

FTG	*Fouilles de Tepe Giyan*, G. Contenau and R. Ghirshman (Paris 1935).
FTS	*Fouilles de Tepe Sialk*, R. Ghirshman (Paris 1938-39).
Herzfeld IAE	*Iran and the Ancient East*, G. Herzfeld (1941).
MDEP	*Memoires de la Délégation en Perse* (In progress).
Pumpelly ET	*Explorations in Turkestan*, R. Pumpelly (1908).
Stein AR	*Archaeological Reconnaissances in N.-W. India and S.-E. Iran*, A. Stein (1937).
Stein ATAP	*Archaeological Tour of the Ancient Persis*, A. Stein (1936).
Stein IA	*Innermost Asia*, A. Stein (1928).
Stein ORWI	*Old Routes of Western Iran*, A. Stein (1940).
TBA	*Tal-i-Bakūn 'A': Season of 1932*, A. Langsdorff and D. McCown (1942).

TECHNICAL SECTION

3. THE RECORDING OF ARCHAEOLOGICAL STRATA

Without any depreciation of the high value of the archaeological fieldwork carried out in India by past generations of scholars, Indian and European, the time has come to recognize bluntly, but in a properly constructive spirit, certain shortcomings for which remedy is overdue. Of these the most important is the omission to appreciate adequately the significance of stratification, *which is as fundamental to the science of archaeology as it is to the parent-science of geology. The scientific study and record of stratification were established in principle over half a century ago by General Pitt-Rivers, and his standards, extended and elaborated, are now international. Their full application to Indian archaeology is essential to the reputation of Indian scholarship, and the rising generation of Indian archaeologists is in fact rapidly becoming familiar with them. These notes are offered as an introductory guide.*

1. 'HORIZONTAL' AND 'VERTICAL' EXCAVATION

BY 'horizontal' excavation is meant the uncovering of the whole or a large part of a specific phase in the occupation of an ancient site. The excavation of a considerable part of the Parthian level of the second city of Taxila (Sirkap) is a good example.[1] By 'vertical' excavation is meant the excavation of a restricted area *in depth*, with a view to ascertaining the succession of cultures or phases, and so to producing a culture-scale or time-scale for the site. Examples may be found above on pls. XXII and XXXIX. The two procedures are complementary, not mutually exclusive, and the antagonism which is sometimes thought to subsist between them is an unreal one. Big excavations generally attempt, but rarely achieve, both methods. Before planning the course of an excavation it is necessary to consider carefully which method is (*a*) desirable and (*b*) feasible.

Let us examine the nature of the evidence which the alternative methods may be expected to supply. Vertical excavation alone, whilst supplying a key to the length of an occupation, to its continuity or intermittency, and to some part of its cultural equipment, cannot be expected to reveal, save in the most scrappy fashion, the significant environment —economic, religious, administrative—of a human society. In other words, it leaves us in the dark as to those very factors which fit a past culture or civilization into its place in the story of human endeavour and so make its recovery worth our while. It is a railway time-table without a train. The Parthian civilization of Taxila would have had comparatively little meaning for us had we not an extensive knowledge of the general lay-out and shape of its streets and shrines, its palaces, its houses and its shops. Similarly, Mohenjo-daro could never have taken its high place in the history of urban development, with its rectilinear street-plan, elaborate drainage and sophisticated brickwork, had it not been for the somewhat summary but far-reaching horizontal excavation to which it was submitted.[2] Painstaking vertical sections carried down to the natural surface of the subsoil would doubtless have given us valuable information for which we are still waiting and without which we cannot at present relate with sufficient precision the Indus civilization to other cultures in India or Iran. But, as a *civilization*, the Mohenjo-daro complex would not

[1] J. Marshall, *Guide to Taxila* (3rd ed., Delhi, 1936).

[2] Admittedly the excavated buildings show several constructional phases but the excavators relate them to a single culture-phase.

have existed for us, and it is as a civilization, not as a mere local 'culture', that Mohenjo-daro looms over the prehistory of Asia.

It may be affirmed therefore that sooner or later the horizontal excavation of a typical or major site is an essential procedure. Sooner or later. Whether in a particular case vertical excavation shall precede horizontal is partly a matter of chance or opportunity, largely a question of the state of relevant knowledge. In India at the present time the matter is not in doubt. The extensive horizontal excavations referred to, coupled with others on a smaller scale, have created or emphasized an urgent need for vertical correlation. The trains have been running vigorously but we do not know clearly when they are running, or where they start, or their stopping-places, or their destination. We need time-tables. We need carefully dug and recorded vertical sections, sufficiently deep to reach the starting point, sufficiently wide to ensure an accurate recognition of the route. Later, with the new information thus gained at our disposal, we shall be able to stop at intermediate stations and explore. Horizontal excavation will then once more be feasible and necessary. Meanwhile the major need of Indian archaeology is clear: it is vertical digging, the recovery of the *stratification* of Indian prehistory and early history by means of carefully recorded sections.

2. HOW *NOT* TO RECORD STRATIFICATION

With the fullest recognition of the sterling value of the famous excavations carried out at Taxila, Mohenjo-daro, Harappā and Chanhu-daro, it must be admitted that on no single one of these sites were the methods of stratification observed that have been standard elsewhere in field-archaeology since the pioneer work of General Pitt-Rivers and some of his German contemporaries at the end of the nineteenth century. At Mohenjo-daro, for example, in Mackay's excavations the depth of every structure and every object was recorded meticulously in relation to a fixed bench-level, in one area '178·7 ft. above mean sea-level' and in another '180·9 ft. above mean sea-level'.[1] A similar system was adopted at Chanhu-daro. At these sites and at Harappā, certain 'strata' were recognized on this or a similar basis. In other words, the so-called 'stratification' of the Indus Valley civilization is dominated, not by local observation, but at long range by the sea-level at Karachi. Buildings were allotted to strata in accordance with the height of their floors or doorways above this level; structures and objects at the same height being ascribed to the same 'stratum'. Without exaggeration this mechanical classification may be described as the very parody

[1] The excavator's own description of this incredible system may be quoted (E. J. H. Mackay, *Further Excavations at Mohenjo-daro*, 2 vols., Delhi, 1938). 'In order that our deep digging might be satisfactorily carried out, an extensive system of levelling was necessary. The levels of every building and of every well were therefore taken, especial attention being paid to door-sills and pavements as being for purposes of stratification the most important parts of a building. In addition, both the locus and level of every object found, whether it was regarded at the time as important or not, were noted in order not only to correlate each object with the building in which it was found, but also to facilitate the study of the development of art and technique. As some thousands of objects were unearthed in the sections that we excavated, it may be thought that this procedure was unnecessarily laborious. This, however, was not the case. The levelling instruments were set up early in the morning and remained in position all day; and it was quite a simple matter to take the level of each object directly it appeared.

'There are, however, limitations to the deductions to be drawn from the levels at which objects are found. For instance, if a jar or a seal lies either below or at some distance above a pavement or door-sill, it is difficult to decide to what period it belongs. We, therefore, adopted the rule that all objects found in or near the foundations of a building be assigned to the period of that building rather than to the previous phase, unless they actually rested on the remains of a pavement of earlier date; for it is more than probable that they were dropped or left behind when the foundations were being made.' The chapters on the pottery and other finds include page after page of elaborate but insignificant tables based on this procedure.

of scientific method. It is a survival of an obsolete device evolved in the alluvial plains of the great river valleys of Egypt and Mesopotamia as a rough substitute for exact observation in ill-controlled 'mass-excavations'. It has no place whatsoever in the technique of modern field-archaeology.

To appreciate the absurdity of the bench-level method, it is only necessary to recall that, except perhaps at the earliest period of a site (hardly ever adequately explored), an ancient city of this kind is *never* level. Very rarely is a city completely destroyed and completely rebuilt at one moment and at one level horizon. Normally, a house is reconstructed or replaced as it decays, or at the whim of its owner. The town as a whole is constantly in a state of differential destruction and construction. Individual building-sites rise above their neighbours; the town-site itself rises and assumes the contour of a hill; buildings on its slopes are contemporary with buildings on its summit. A doorway or a potsherd may be found at one spot 20 feet below a doorway or a potsherd of precisely the same date at another spot. Such differences, of vital importance to the scientific interpretation of the site, are ironed out and obliterated by the bench-level. If it be necessary to illustrate further the dangerous fallacy of this method, the attached diagrams (fig. 1) may serve. I will also quote an important note which I have received in a different context from Professor Stuart Piggott. Prof. Piggott writes:

> The excavations at Chanhu-daro in Sind are of particular importance in defining for the first time a culture subsequent to the Harappā occupation and hitherto only surmised on the strength of a type of pottery known from the site of its first identification as Jhukar Ware. At Chanhu-daro the Jhukar culture is represented not only by pottery but by the remains of primitive dwellings built on and in the ruins of the final Harappā occupation of the site, an assemblage of characteristic stamp-seals, and a number of bronze objects. Among the latter is a type of pin made by thinning out one end of a copper (or bronze) rod and coiling it downwards to form a loop—at least seven such pins were found in Mackay's excavations and are described by him on pp. 194-95 of his report[1] where however he claims that they belong both to the Harappā and to the Jhukar occupations, in fact suggesting that they are in the nature of a Harappā survival into the Jhukar period—'four of these pins were found in the Jhukar levels . . . and the supposition is that they were made in that period as well as in the one before'. Mackay is at pains to point out that this type of pin is unknown from any other Harappā site and adds, 'Why this type should be so common at Chanhu-daro and so rare at Mohenjo-daro cannot at present be explained'.[2] The situation obviously needs to be reviewed especially as the pin-type in question has analogues from Iraq and Iran which raise chronological questions.
>
> The methods of excavation and recording in the Chanhu-daro excavations as set out in the report give us, I think, the clue to the solution of the problem. Here, as in the earlier excavations at Mohenjo-daro and Harappā, stratification as understood by modern archaeologists was simply not observed, objects and buildings being assigned to a relative period on the grounds of their vertical position below (or at Chanhu-daro, above) an arbitrary datum with no reference to their context in made soil, rubbish-tip, débris of collapsed buildings, storm-wash, trodden 'floors' or any of the other many features which determine the actual stratigraphy of the deposits in a long-occupied site. Even the elementary fact that occupation 'levels' are seldom more than very approximately even, and that in the later stages of a 'tell's' history the surface is conspicuously convex, is ignored, so that an object which may have been found with ten feet of accumulated strata over it in the middle of the mound is equated, on the grounds of its position relative to datum, with another found in the superficial soil nearer the periphery. Nowhere in Mackay's report is there any indication that the Jhukar 'floor' was even recognized, although there must have been an identifiable soil-change with trampled surface over the ruined Harappā buildings and equivalent to the hut-foundations of re-used bricks and the rough fire-places which constitute the architectural remains of this phase.
>
> If with these reservations in mind we plot the find-spots of the seven pins in relation to the contours on the plan on pl. III of the report and the small-scale sections on pl. V, we find no reason to associate any with the Harappā culture, the pin found at the 'lowest' level (locus 379) being on the extreme edge of the

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[1] E. J. H. Mackay, *Chanhu-daro Excavations 1935-36* (New Haven, 1943).

[2] The type does not, in fact, appear at Mohenjo-daro at all.

mound and the remainder concentrated in the area of the Jhukar hut-sites and fire-places at depths (for what it is worth) all within the range of those recorded for the distinctive Jhukar seals. There seems therefore no cause for anxiety or reason for supposing the pins to be anything but a type of the Jhukar culture and in no way associated with that of Harappā. Although with a long history in Iraq, this type first appears at Hissar in IIIB, and in view of the other links between this cultural phase and that of Jhukar it is of importance to define the horizon of the pins at Chanhu-daro.

The conditions of excavation being so unsatisfactory, I am not entirely happy in accepting the Chanhu-daro hoard of bronze objects (No. 2365, Mackay *op. cit.*, pl. LXVIII) which contains a double spiral-headed pin, as being unambiguously of Harappā date. The remaining objects in the hoard are certainly all of Harappā type but it was found towards the outskirts of the mound and jus below the surface, with no significant association recorded, while five Harappā seals found in the same immediate area are all from what seems a significantly homogeneous level two feet below the hoard and suggesting a 'floor'. It is a commonplace that a metal hoard should be dated by its latest contained type and, although double spiral-headed pins go back to Hissar IIB, they persist into IIIA, and, since the known Indian contacts with the later Hissar phases do not seem otherwise to antedate III, one is tempted to associate this hoard too with

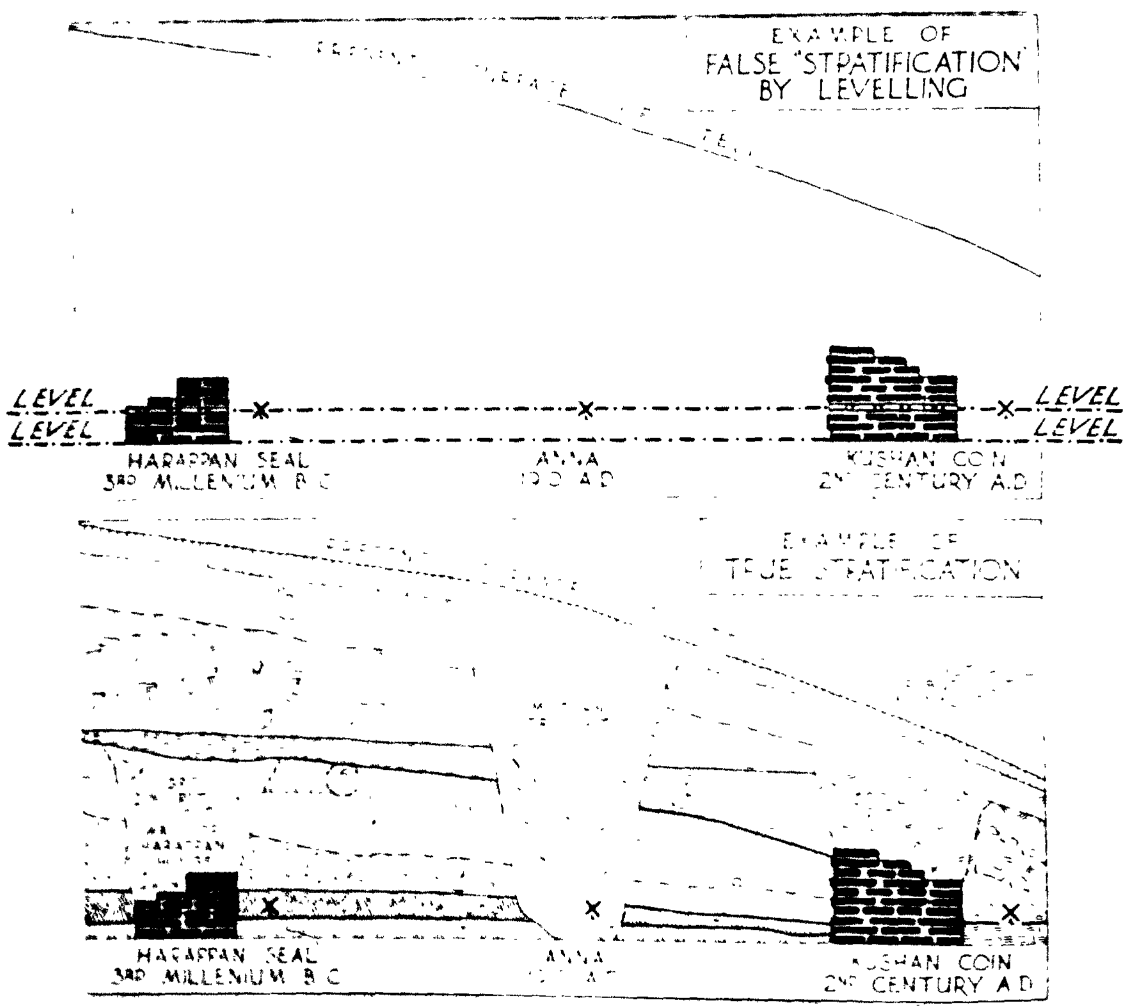


FIG. 1

Hissar III and with the Jhukar, rather than the Harappa, occupation of Chanhu-daro—a chronological position also in accord with the Anau III evidence.

Fig. 1 illustrates the fallacy of equating objects or buildings in date on the basis of *level*. It also illustrates the same section as explained by accurate stratification.

3. THE FORMATION OF STRATA

So much for the negative aspect of the matter. Now for its positive aspect. What are the real principles of stratification, and how is stratification recorded by the trained archaeologist?

The principle is a simple one. In general, the human occupation of a site results in the accumulation of material of one kind or another on and about the area occupied. Objects are lost or discarded and become embedded in the earth. Floors are renewed and old ones buried. Buildings crumble and new ones are built upon their ruins. A flood may destroy a building and deposit a layer of alluvium upon its debris; and later, when the flood has subsided, the levelled site may be reoccupied. Sometimes the process is in the reverse direction: evidences of occupation may be removed, as in the deepening of an un-surfaced street by traffic, or the digging of a pit for the disposal of rubbish or for burial. In one way or another, the surface of an ancient town or village is constantly altering in response to human effort or neglect; and it is by interpreting rightly these evidences of alteration that we may hope to reconstruct something of the vicissitudes of the site and its occupants.

It will be seen at once that this is more than a matter merely of equating building-levels—even if that is accurately achieved, *not* by means of a mechanical bench-level but by a careful observation of the continuity of strata from building to building. Within and about a single building the accumulation of floor-levels and of occupation-debris may have much to tell us as to the character and the fluctuations of its occupation. A building may begin its life as a well-swept palace: economic or political changes may eventually reduce its status to that of a tenement-building or workshop. Rough floors may replace the original paving, hearths or furnaces may usurp the 'courts where Jamshyd gloried and drank deep'. Such changes are of primary significance to us in our attempt to reconstruct the social evolution and even the episodic history of a past age. But by the hasty excavator, intent only upon uncovering the palace walls, these more subtle evidences will pass un-observed. And, once destroyed, their evidence has vanished for ever. A page in the history of human endeavour has been obliterated by negligence. Excavation is destruction, and its only justification is the careful and complete recording of all evidence revealed in the process.

4. THE IDENTIFICATION AND INTERPRETATION OF STRATA

In practice, the identification and correlation of the strata or layers which represent the successive phases in the archaeological 'history' of a site is one of the principal tasks of the excavator and will occupy the major portion of his time. The task is one which involves clear and logical thinking reinforced by experience and infinite patience. Normally, the strata are differentiated by variations in colour or material or content. Not infrequently, however, these variations, particularly under the bleaching influence of an Asiatic sun, present difficulty even to the experienced eye. Damping and careful scraping with a knife or *hail*, will often provide the remedy by bringing out the more subtle variations of colour or material. Observation in different lights at different times of the day may

help. In the case of a difficult and important section, observation may be continued over a period of days before certainty is reached. And finally an attempt must be made to 'read' the section—to discriminate, without prejudice, between the more significant and the less significant differentiations of strata: for example, between a mere 'tip-line' in a continuous accumulation on the one hand and a substantive and emphatic occupation-level on the other. It is not enough to identify layers, although that is of course the essential first step; it is the task of the archaeologist to *interpret* them, to understand the sentence as well as to transliterate it.

The correct interpretation of a section then is a matter of accurate observation, clear-thinking, and experience. Let us pause for a moment to consider this in practice. We will assume that the draftsman has correctly identified the changes of material, i.e., the strata, and (measuring from a carefully levelled datum-string) has accurately transcribed them to squared paper. His delineation will probably appear as in fig. 2A. But this delineation,

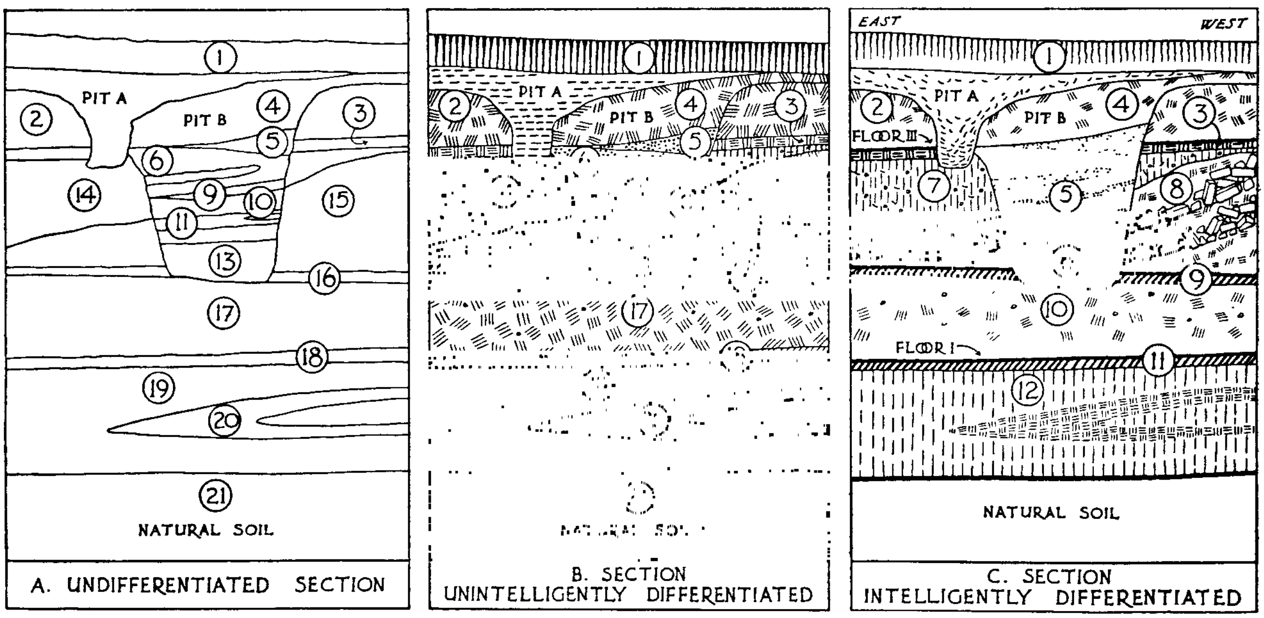


FIG. 2

although indicating the presence of strata, does little or nothing to indicate their varying character and significance. It is a meaningless collection of lines—a procession of letters not yet divided into words. A more ambitious draftsman may attempt to indicate something of the individuality and diversity of the strata, and fig. 2B illustrates such an attempt. This fails in two main respects. First, the general evenness of tone throughout the section produces the unmeaning monotony of a sentence spoken without inflection, and so fails largely to convey the intended impression. The draftsman has not realized the varying significance of the facts which he is recording; he has failed to see the wood for the trees. Secondly, he has not realized that his rendering is not merely a transcription of accurately measured or even accurately emphasized lines: it is, or should be, also an accurate *picture* of what he sees. Not only should lines of demarcation be transcribed from measurement, but also the size, shape and position of brick-bats, bones, sherds or other materials which, by their character and quantity and by their 'angle of rest' in the soil, combine to indicate the nature of a stratum and the method of its accumulation. An intelligently drawn

section is far more than a diagram; it is a *picture*, representing not merely the skeleton but also the vital flesh and blood of its subject. Fig. 2C is fig. 2B corrected in this sense.

However rudimentary and obvious these details may seem, I have no hesitation in emphasizing their importance. A well-drawn, i.e. intelligently recorded, section is relatively a rarity. But it is nevertheless a basic necessity of modern fieldwork.

5. OTHER TECHNICAL DETAILS

Three or four other points, minor but not negligible, may be added in connection with the recording of sections.

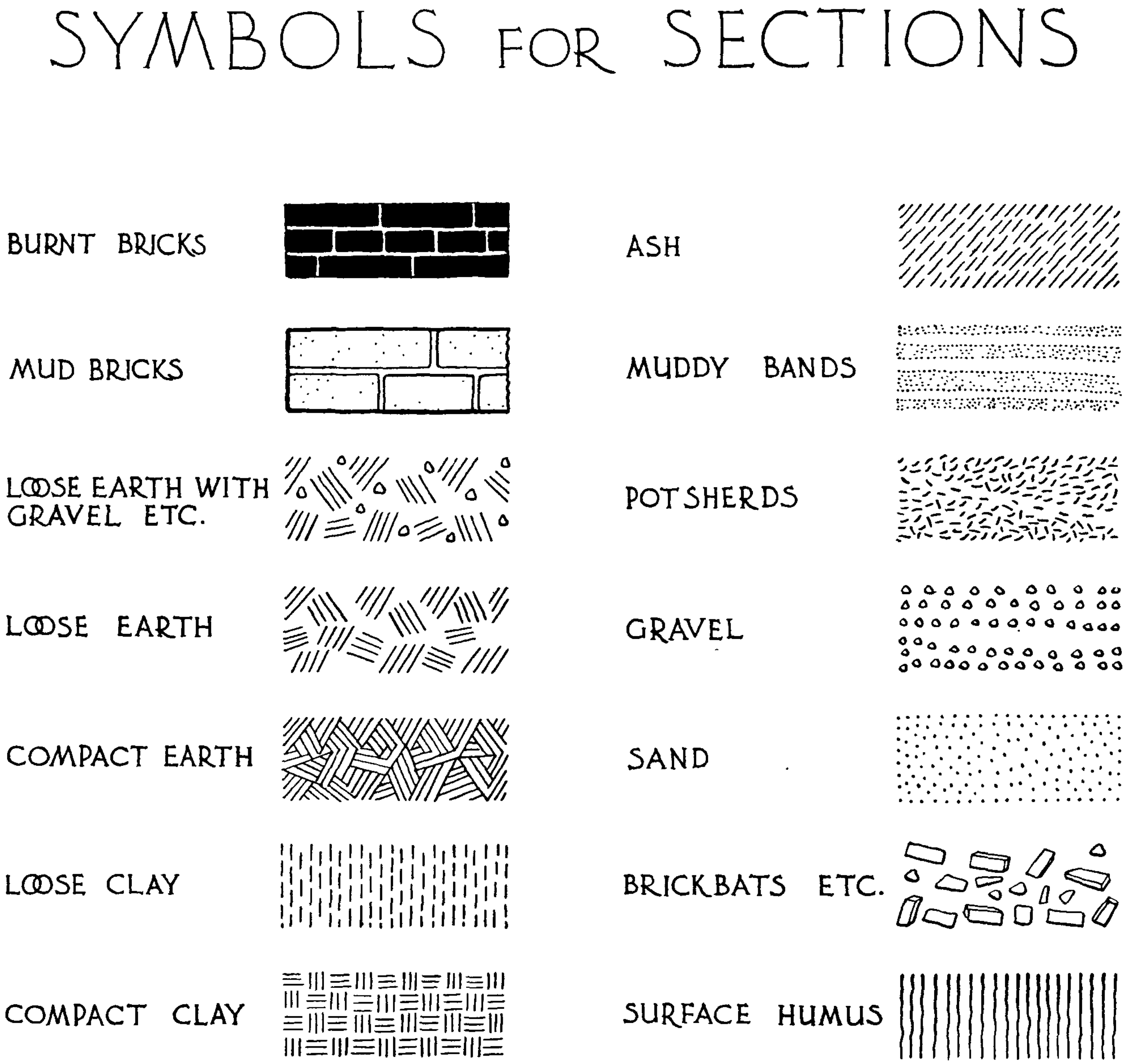


FIG. 3

First, sections are drawn by means of vertical measurements above or below a horizontal string firmly stretched across the section and levelled either by means of a bubble-level or by a surveyor's level laid on the terminal points. Here again details should not be neglected. Only string of the best available quality should be used; inferior string breaks or, worse still, stretches and sags. In any case, the string should be supported on carefully levelled pegs at horizontal intervals of ten feet. Moreover, to avoid errors from stretching or other causes, the level of the string should be checked once or twice during the day.

Secondly, as to *scale*. The smallest scale at which the detail of a section can be accurately rendered is ½ inch = 1 foot, and this may be regarded as standard. Sometimes 1 inch = 1 foot is necessary, but larger scales practically never.

Thirdly, there is a common tendency on the part of the inexperienced draftsman to exaggerate inequalities in the surface of a stratum and so to obscure its general contour and character. He should be reminded that, on the normal scale of ½ inch = 1 foot, the picture will be one twenty-fourth of the size of the original. An inequality, therefore, rising actually 2 inches above the average level of a stratum will, in a normal scale-drawing, vary by only one-twelfth of an inch above the level, and so will form a nearly negligible break in the surface. Almost invariably the draftsman, again seeing the trees rather than the wood, will over-emphasize the obstacle.

Lastly, there is the question of *symbols*. No single scheme of symbols has yet been generally adopted for the easy representation of different types of soil or deposit, but those now in use by the Archaeological Survey of India are here illustrated for information (fig. 3).

R. E. M. W.

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